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GOODWIN J. KNIGHT, *Governor*
HAROLD J. POWERS, *Lieutenant Governor*

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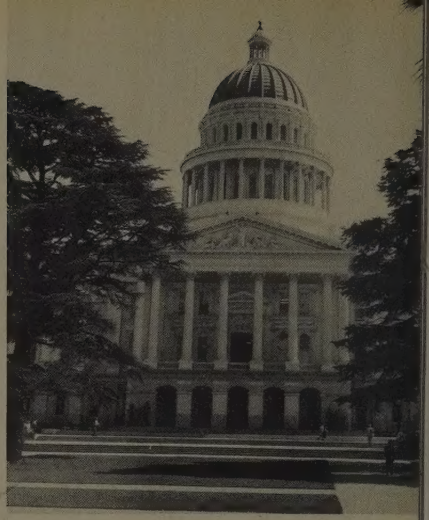

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ANNUAL REPORT—1955

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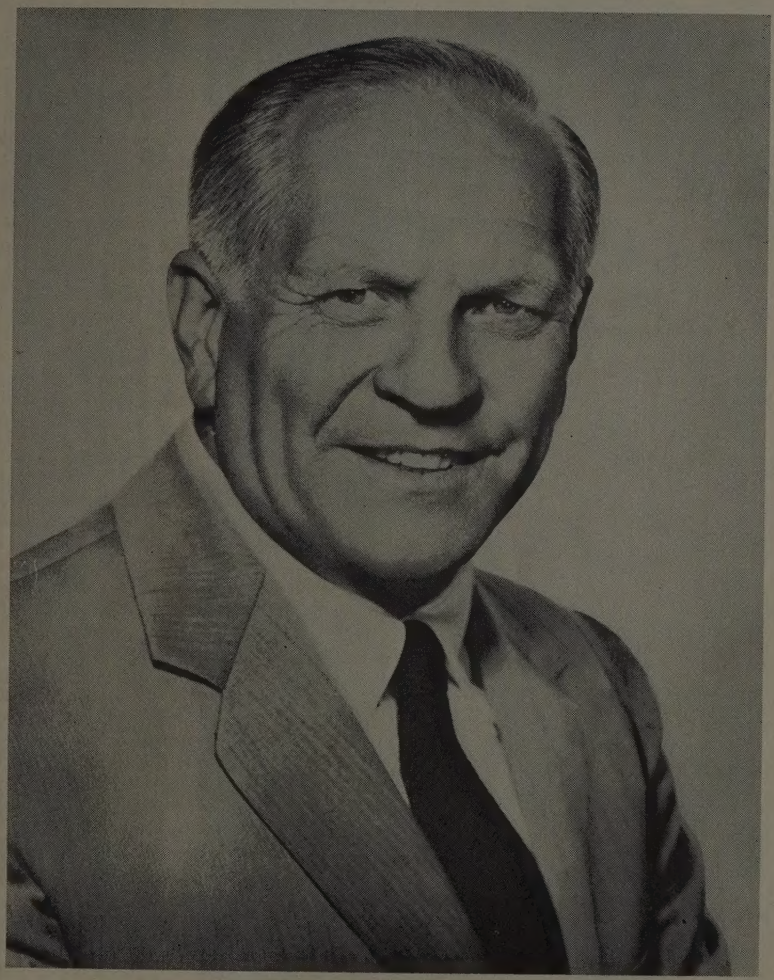


THE HONORABLE GOODWIN J. KNIGHT, Governor of California

California Department of Agriculture, Administrative Staff, Division and Bureau Chiefs. FRONT ROW (seated, left to right), Chas V. Dick, Division of Plant Industry; W. J. Kuhrt, Division of Marketing; Dr. A. G. Boyd, Assistant Director; W. C. Jacobsen, Director; C. J. Carey, Deputy Director; Romain Young, Regional Coordinator; Dr. E. W. Braun, Bureau of Markets; Charles P. Cusick, Personnel Officer. MIDDLE ROW (standing, left to right), Bureau Chiefs: V. O. Wolcott, Field Crops; C. H. Perkins, Fiscal Officer; George K. York, Market News; Allen B. Lemmon, Chemistry; Gilbert L. Stout, Plant Pathology; Dr. L. E. Bartelt, Poultry Inspection; Logan Morton, Livestock Identification; O. A. Ghiggoile, Dairy Service. TOP ROW (left to right), Bureau Chiefs: Dr. H. G. Wixom, Livestock Disease Control; A. P. Messenger, Plant Quarantine; W. F. Allewelt, Shipping Point Inspection; H. W. Poulsen, Fruit and Vegetable Standardization; J. E. Brenton, Weights and Measures; D. A. Weinland, Milk Control; Robert W. Harper, Entomology. Not shown in the above picture are Dr. J. E. Stuart, Chief of Division of Animal Industry; Regional Coordinators John B. Steinweden, Los Angeles, and Charles H. Kinsley, San Francisco; and the following Bureau Chiefs—Dr. G. A. Boyd, Meat Inspection; W. S. Ball, Rodent, Weed Control, Seed Inspection; J. C. Harlan, Market Enforcement; George A. Scott, Agricultural Statistics.

Report of the Director

W. C. JACOBSEN, *Director of Agriculture*

The Director's Report for 1955 becomes an introductory summary of department activities elaborated upon elsewhere in this annual report by the several functioning units of the California Department of Agriculture. It is designed to emphasize and highlight certain important features for advice to the public generally and to agricultural people in particular. It is fitting to invite attention here to the recently published summarization of the department's functions and services under the title of "What We Do," appearing in the Department Bulletin for July-August-September, 1955. This bulletin also includes an organizational chart of the department.

Cash receipts from farm marketings, often described as the farm gate value of crops, is a statistical common denominator recognized throughout the Country. If this universal standard is used to show California's relative position in agriculture, the conclusion continues that these returns for the agricultural products of our State will once again place us in first rank. The amount, when finally compiled, will undoubtedly show an increase of between 4 and 5 percent, to bring our total well above $2,600,000,000 for 1955, and probably within $100,000,000 of the high point reached in 1952. This development will be in marked contrast to the preliminary readings, which show an estimated decline in cash receipts from farm marketings nationally of more than 3 percent.

When the United States Senate Committee on Agriculture and Forestry visited California last November seeking solutions to the national farm problem, it was evident from the testimony presented by California farm leaders that the great diversification of agricultural production here was an important factor in aiding the agricultural economy of this State again to expand appreciably over the past two years. It was shown that California agricultural operations were generally managed by people who had organized their production and marketing activities on a coordinated basis, with considerable emphasis on self-help programs; consequently, any political device to ameliorate the farm income decline complained of elsewhere in the Nation possessed little appeal. It is not to be inferred that every branch of our widespread agricultural industry is wholly devoid of depressed areas, but in the overall picture, the situation for California producers certainly appears to be more favorable. This position is not out of accord with an early developed objective of those pioneers who fostered diversification in agricultural enterprises, who insisted upon adequate pest preventive measures, who relentlessly pursued the development of programs for adequate water supplies, who sought improved varieties of seed, nursery stock and animal parentages, who embraced mechanization, and who recognized that regulation of quality standards and orderly marketing procedures must be followed to meet competition in distant outlets.

Now, with increase in population steadily continuing, the complexion of the marketing problem is changing to portend greater and greater utilization of our farm-supplied commodities at home. This factor becomes clearly evident in the field of livestock, poultry and their products, when careful appraisal shows California is recorded as **slaughtering** more beef and sheep than any other state, although we are far from **producing** this output; in fact, California is on the receiving end for a portion of the demand of all such commodities, except turkeys. Even in the case of turkeys, state consumption now accounts for 60 percent of our production.

The fact that California is becoming the market outlet receiver of farm commodities from other areas of the Nation in greater volume suggests that in meeting such competition the home-grown product, heretofore marketed on the basis of a concept that intrastate markets did not always require the meticulous attention for out-of-state shipments, will need more careful attention as to its quality and wholesomeness.

Recalling the department's responsibility as set forth in the Agricultural Code (Section 30), to "promote and protect the agricultural industry of the State," it appears fitting to evaluate our activities in each of these fields.

PROTECTIVE FUNCTIONS

As a result of collaboration of state agricultural regulatory officers with representatives designated by the Secretary of Agriculture, progress has been made in developing and adopting two important policy programs to guide and assess the responsibility of each of the state and federal agencies in plant pest control and prevention, and in animal disease prevention and suppression projects. Over the years this fundamental responsibility of the Federal Government in these fields of pest prevention and cooperative suppression had been somewhat sidetracked in the belief that research and extension afforded the primary solutions to such problems. Policy programs now adopted are designed to make federal cooperation with states more realistic and effective, with more trained and experienced personnel responsive to the fundamental objectives to keep out seriously destructive pests of our plant and animal industries, and to initiate or participate in rapid action against incipient outbreaks or new findings of such pests and diseases. At the same time, the several obligations of the states are recorded. The great advancement made in improved pesticides and in application techniques is still insufficiently adequate to offset the need to maintain basic insurance derived from quarantine enforcement. The burdensome costs of controlling additionally introduced insect pests, plant diseases, noxious weeds and pest animals will still be higher than those required for prevention.

Mexican Bean Beetle Eradicated

In the category of plant pest problems, it can now be recorded that the threat of Mexican bean beetle to the production of one of our most important field crops has been relieved by announcement that this pest has been eradicated. A three-year waiting period, following the finding of the last live specimen, culminates nine years of activity in cooperation with the Ventura County agricultural commissioner, the Lima Bean Growers Association, the Federal Government and others participating in work which involved intensive inspection, application of control procedures and observance of quarantine rules.

Khapra Beetle

The determination having been made late in 1954 that the nature of the Khapra beetle, *Trogoderma granarium*, was such that eradication should be attempted, it can be reported that although appreciable progress has been made since the program was initiated in January, 1955, many months of intensive effort are still needed. The test treatment of a large warehouse in Imperial Valley, employing the procedure of wrapping the entire building in a gas-tight plasticized cover and utilizing a theoretically adequate dosage of methyl bromide as a fumigant, marked the beginning step. This test, made in cooperation with the United States Department of Agriculture and the University of California, was undertaken to determine if fumigation by such a method, supplemented by insecticidal sprays of the ground area surrounding the building, could be relied upon to eradicate the insect from this type of premises.

This first test, conducted on a well-emptied warehouse, proved satisfactory to such an extent that it was decided to continue such treatment, at least of warehouses when they were relatively free of stored products. Later tests demonstrated comparable effectiveness in warehouses filled with bulk grain, thus permitting greater latitude in the type of building that could be treated with expectancy of success.

During the year, 102 properties were treated out of the total of 233 found infested prior to December 31, 1955. Although this involved less than half of the individual infested properties, it represented 38,492,454 cubic feet of space treated out of an estimated total of 51,888,028 cubic feet of infested properties in California.

Federal participation in the project has been most helpful and has been well coordi-

nated with state and county activities. The federal contribution has been directed mainly toward survey work and the purchase of methyl bromide, malathion and diesel oil for treatment of infested properties. The State has paid all contract costs for wrapping and fumigating structures; the county's contribution has been mainly in the fields of survey and quarantine enforcement.

Survey in California has been carried out mainly by federal and county agricultural inspectors. Since initiation of the Khapra beetle survey program in November, 1953, 23,438 properties have been inspected at least once; in addition there were 5,121 repeat inspections, making a grand total of 28,569. During this period of slightly more than two years, the 233 infestations previously referred to were found.

Spotted Alfalfa Aphid

During 1955, the newly encountered aphid pest of alfalfa, formerly believed to be the yellow clover aphid, *Myzocallis trifolii*, has been determined to be a separate and distinct species, identified as the spotted alfalfa aphid, *Therioaphis maculata*.

The insect was first found in California during February, 1954, on bur clover in the City of San Diego. By the end of the year, it was present in alfalfa plantings in San Diego, Imperial, Riverside, San Bernardino, Orange and Los Angeles Counties. During 1955, the pest spread rapidly northward, so that by the end of the year it had reached a total of 33 counties, and had advanced as far as Contra Costa County on the coast and Shasta County at the northern end of the interior valley. Department records fail to show that there has ever been such a destructive pest which spread so far and so rapidly, as this insect has done.

Winged aphids are able fliers, and wind currents carry the insect for great distances. Movement of green cut hay, contaminated equipment or vehicles are other means by which the pest may be spread. The nature of the pest does not make it amenable to quarantine action.

While alfalfa appears to be the favored host plant, bur clover and medic seem to serve as good hosts. Red and white clovers are not attacked, but a number of other clovers and leguminous plants sustain the insect.

A canvass of county agricultural commissioners revealed that 725,000 of the State's 1,120,000 acres of alfalfa were infested to some degree during the 1955 season. Insecticide applications varied from none to as many as seven applications per planting, depending upon local conditions. The average in the infested area was two treatments, thus making a total of 1,450,000 acres treated. Treatment costs approximated $4,000,000, but despite this control attention, crop losses were estimated at $9,000,000.

Although this insect may be controlled by chemical insecticides, the cost of such treatment presents an added economic burden on the industry, and is further complicated by the difficulty of properly timing controls so as to attain the desired results without causing damage to beneficial insects or leaving undesirable spray residues on the harvested crop. The two approaches which seem to have the most promise as partial solutions to the spotted alfalfa aphid problem are development of resistant varieties of alfalfa and colonization in infested areas of beneficial insects that will control the pest. The University of California and the United States Department of Agriculture are working toward these two objectives. The biological control approach is being pursued from the standpoint of utilizing native insect predators and fungi that already exist in the State, as well as by introduction and rearing of beneficial parasites and predators from other areas of the world.

Agricultural regulatory officers must apparently best confine their assistance to advising on suppression techniques, since its life history, adaptability to ready spread, and nonamenability to reasonable restrictive measures would seem to take this insect outside the category of those capable of justifying eradicative attempts, unless a policy were adopted to use public funds for pests of a comparably generalized character.

Mexican Fruit Fly

The intensive measures inaugurated during 1954 against the infestation of Mexican fruit fly were continued during 1955. Spray applications were continued in the buffer zone on the California side of the international border on a routine basis throughout the year, except in Imperial County where work was suspended during the three summer months when the fly is not active. Eighteen complete bait sprays were applied to the San Diego protective zone, and 12 applications were made to that portion of

the Calexico protective zone treated by ground rigs; 620 acres of citrus plantings in the Calexico area received 13 applications by airplane.

Although intensive trapping and fruit inspection surveys were made in the town of San Ysidro on the California side of the Tijuana Valley, no additional findings of the fly were taken in this State. This intensive survey was supplemented by trapping carried on in other southern California citrus-producing counties. Federal trap lines in San Diego and Imperial Counties of California, and in Yuma County, Arizona, consisted of 2,432 traps on 461 properties. In addition, 618 traps were maintained by personnel of the county agricultural commissioners' office in San Diego, Orange, Los Angeles, San Bernardino and Riverside Counties.

Intensive activity is carried on through a cooperative program between the United States Department of Agriculture and Mexican authorities in the Tijuana, Mexicali, Ensenada and Tecate areas. In contrast to 1954 when flies were taken throughout the year in the infested areas of Baja California, only three positive findings were made during 1955.

"Medfly" in Costa Rica

California fruit growers have been singularly conscious of the threat of fruit flies which might affect the State's valuable fruit and vegetable production. A most disquieting situation has come to light in Costa Rica, where Mediterranean fruit fly apparently has been on the loose for a number of years. Fortunately, the hazard of transportation is pretty well limited to airplane flights which might carry infested host fruits in cargo and passenger baggage.

The only way to offset this threat is to intensify inspection at international airports, a measure which should be regarded as pointed to the necessity of intensified passenger baggage inspection at these points of entry rather than engage in discussions to settle how the percentage of inspections may be reduced to make less expensive the operation of customs, and the agricultural aids thereto. Plant quarantines on paper can never be relied upon to prevent pest introduction, unless backed by adequate and judicious enforcement.

Walnut Husk Fly

The finding of walnut husk fly in Sonoma County poses a difficult problem. In that area more extensive surveys are needed to give a complete picture of the spread of infestation; following these surveys, an analysis must be made to determine whether or not eradication is feasible. Intensive control procedures undertaken in a preliminary way may lead to a finding of ways and means eventually to result in its elimination from the Sonoma County area. This development will involve utilization of quarantine procedures to protect against the movement of the fly through containers and host nuts.

Quick Decline Disease

Discussions have been under way to formulate a program for further protection of the commercial citrus acreage in the San Joaquin and Sacramento Valleys against the introduction and spread of quick decline disease. These valleys now contain the principal remaining acreages which are apparently free of quick decline disease.

The diagnosis of quick decline infection in Meyer lemon trees indicates this plant may be a potential infective reservoir from which spread of the disease would ensue if and when a suitable vector were introduced into the areas. Meyer lemon trees apparently have carried quick decline, although in a masked form, from the time of their introduction as a desirable ornamental through the Plant Introduction Gardens at Chico, California, many years ago. Removal of all Meyer lemon trees from the vicinity of commercial citrus production to reduce the hazard of possible future infection is of primary concern to the citrus industry in the northern portion of the State. Action to accomplish any such purpose will require legislation and finances, together with adequate cooperation from the several counties involved. It is anticipated that authorizing legislation will be requested at any 1956 Special Session.

The Joint Interim Legislative Committee on Agricultural and Livestock Problems has made a detailed study of the problem, and has recommended the undertaking of such a program.

Agricultural Pest Control

A survey on the extent and cost of spraying and dusting on farms in 1952 published in 1955 by the United States Department of Agriculture, indicated that California farmers spent approximately $16,000,000 for pesticides applied by themselves; they paid another $34,000,000 to agricultural pest control operators for pesticides and application

costs. This combined figure of $50,000,000 was approximately one-fifth of the national total. The importance of the agricultural pest control business in California is indicated by the fact that 30 percent of all money paid by farmers in the United States to agricultural pest control operators for services, plus pesticides, is spent in California.

The acreage treated for agricultural pest control continues to increase each year. In California the farmers themselves treat 31 percent of the total acreage treated, while commercial pest control operators treated 69 percent, using aircraft on 58 percent and ground equipment on 11 percent of the acreage.

Total acreage treated for agricultural pest control by aircraft in the State has increased tremendously from the 65,479 acres reported in 1934 to 4,853,462 acres in 1955. These figures do not include aircraft application of seed or fertilizer, but they do include the acreage treated by defoliants.

In the animal industry field of the department's protective activities, several important occurrences are worthy of note.

Vesicular Exanthema

Cooperative developments with the United States Department of Agriculture have made possible the liquidation of vesicular exanthema infection remaining on three California ranches. The fact that the 1955 Legislature enacted authority, effective January 1, 1956, to require the cooking of all garbage fed to swine made this liquidation essential in order that this important protective program under the new law could be started, with freedom from the disease to remain the continuing objective. The added bonus that can be gained from this legislation is the potential assistance to protection of human health through mandatory garbage cooking, one of the best known means for curbing the continuity of trichina infestation in pork.

At the end of the year, all commercial garbage feeding ranches in the State were cooking garbage fed to swine. This accomplishment was made possible through the utilization of animal quarantine regulations. By the end of 1955, 465 ranches were feeding garbage in cooked form, and California led all other states in the number of hogs being fed cooked garbage, according to federal reports.

The number of outbreaks of vesicular exanthema during the year was reduced to 15, which compares with 49 during 1954. The number of premises under federal-state quarantine was reduced from 75 to seven.

In view of assurances given to the United States Department of Agriculture that official agencies and the swine industry in California were eager to support any indemnification necessary to liquidate remaining infected ranches, it is hoped that such a measure will put an end to the scourge of vesicular exanthema, which has been costly to the hog industry and the State for 23 years.

Brucellosis

The department completed the eighth year of calfhood vaccination for brucellosis, and records show that over 2,500,000 calves have been vaccinated in that period. The California plan to bring brucellosis under control, by making vaccination compulsory for all dairy-type calves, is outstanding and is regarded as a model plan by many other states. The fact that beef-type calves have been similarly treated in great majority, through voluntary action, lends encouragement to the belief that in due time this phase will become mandatory also.

As an indication of the benefit of vaccination to cattle owners, our report covers the result of a milk ring test conducted on all dairy herds during the year. This test indicated that 55.9 percent of California milking herds show no evidence of brucellosis infection. As further evidence of the benefits of vaccination, blood tests conducted during the year indicate the incidence of infection has been reduced to approximately 4 percent in all dairy cattle. At the beginning of the vaccination program, it was estimated that 17 to 18 percent of all dairy cattle in the State were infected with the disease.

In order to implement further the cleanup program against brucellosis, both interstate and intrastate regulations, which had been adopted earlier, were reviewed and brought up to date at a series of public hearings. These new regulations, which are designed to prevent the movement of animals not showing evidence of vaccination, will become operative at the beginning of 1956. With such progress accomplished, it would appear to be just a matter of time until the dairy and beef cattle industry requests the perfection of plans to provide for areas certified as brucellosis-free within a recog-

nized or prescribed tolerance. Further evidence of interest in dealing with this disease comes with the speeding up of trials on the whey-test for diagnosing infection.

The impetus given to brucellosis cleanup in the Nation by federal appropriation seems to assure to this problem more vigorous attention than has ever been possible heretofore. Many states are setting a deadline for accomplishing complete cleanup within five years.

Poultry Inspection

The 1955 Legislature enacted three laws which add duties to the department involving conduct of inspections of poultry slaughtering plants not being served by federal inspection and/or certification. Two of these laws involve the Division of Animal Industry, which will administer provisions relative to sanitation of poultry slaughtering plants and inspection of their products for wholesomeness prior to movement into trade channels.

A Bureau of Poultry Inspection has been newly established within the Division of Animal Industry to insure the specialized administration, enforcement and supervision needed.

The third law, mentioned here because of its association with this legislative program, regulates proper labeling of poultry and rabbits for advice to consumers in retail outlets. This feature, to be administered by the Bureau of Fruit and Vegetable Standardization in company with their egg inspection work, requires cooperative assistance by county agricultural commissioners.

Other Animal and Poultry Disease Problems

Special attention has been paid to diseases of cattle which either are relatively new to the State or are types to be watched for carefully during inspections of incoming animals. These diseases, which include anaplasmosis, rhinotracheitis and leptospirosis, all require an appreciable amount of additional research on the part of the federal agencies, in cooperation with state experiment stations and veterinary medical schools.

On one occasion, a flock of turkeys showed evidence of ornithosis, but immediate restrictive action to prevent movement of infected birds until adequate treatment had been completed was an aid in preventing spread. This disease is so named as to encompass any of the infections in domestic fowls which have the characteristics of psittacosis in the psittacine birds. Ornithosis is a disease that can affect humans if circumstances chance to be favorable. While not entirely new among domestic fowls elsewhere, California must be carefully alerted to its occurrence. In instances of this sort, the animal and poultry disease diagnostic laboratories maintained by the department serve a vital and necessary purpose.

New California Brand Book

What is believed to be the largest and most complete book of brands used anywhere in the United States was completed during the year. It lists alphabetically all brand designs, and also the registration owners of cattle brands, which total approximately 28,000. This book has been in preparation for a period of approximately six years, and will serve as a valuable reference toward the accomplishment of the requirement that there be but a single brand per owner, effective on and after January 1, 1959.

PROMOTIONAL FUNCTIONS

Most promotional type activities in the department are administered within the Division of Marketing.

Marketing Orders

Twenty-eight self-help type programs continue in operation as an aid to the orderly marketing of California's numerous specialty crops. All but one of the 28 programs were under the California Marketing Act; the one exception was conducted under the Producers Marketing Act.

There is in the course of preparation a regular issue of the Departmental Bulletin covering in detail a presentation of the statutory background available for these marketing programs, analyzing each of the current marketing orders, and explaining the manner in which they are developed, approved, adapted to objective, administered and financed.

Market News

One of the most important features of the work of the Bureau of Market News, conducted on a cooperative agreement basis with the United States Department of Agriculture, is the collection and dissemination of market information so that it may be currently available to producers, shippers and marketers of the commodities covered. For many years this dissemination has been speedily accomplished through the use of radio-telegraph, more recently modernized to the use of radio-teletype transmitters. Because the short-wave frequencies used were among those channels originally allocated by the old Federal Radio Commission, changes in international use made them the sole remaining unauthorized interior facilities utilized on a so-called out-of-band service. As a consequence of hearings before the Federal Communications Commission, an abandonment of these channels for market news radio utilization was ordered. The alternatives were that the service be changed over either to a microwave system or to a landline system. The final decision was that the change-over must be accomplished during the spring months of 1956.

This change-over is in the process of being completed, and it is expected that a change-over to landlines will take place some time during April, 1956. The extent to which disruptions in service will be reflected is conjectural, although every effort is being made to perform the change-over as smoothly as possible.

Fruit and Vegetable Standardization

During 1955, a large number of new and revised regulations were promulgated under the authority of the Administrative Procedure Act, in order to bring these up to date and to eliminate obsolete features. Several hearings were held at the request of individual shippers and organizations to establish modified containers under emergency standards provisions, and within the limitations of the statute. Also, numerous permits were issued for experimental containers, in the interest of expediting the finding of the best and most satisfactory containers for use in the marketing of the several fruit and vegetable commodities in the hope that sooner or later there will be a reduction in the total number of standard containers required for the marketing of these important California commodities. There was particular emphasis on containers for lettuce and carrots.

The enactment of a poultry labeling statute has been referred to above.

It appears also that when the final record is tabulated, the volume of canning tomatoes submitted for inspection will show that the tonnage per acre has exceeded any previous year's average. It is notable that within a span of 10 years the improvement in varieties and cultural practices has more than doubled the tonnage produced per acre, which jumped from 7.5 tons to 17.5 tons.

Weights and Measures

The 1955 Legislature established standards for brake fluid, requiring the licensing of manufacturers, and requiring that this important adjunct to automobile and truck operation be brought up to a minimum specification. This law, which became effective September, 1955, will be the means for eliminating a number of unsatisfactory products for motor vehicle use.

Milk Control Law

In spite of the prospect of many modifications in the Milk Control Law anticipated for the consideration of the 1955 Legislature, relatively few were enacted, and these were largely designed to clarify features in the interest of avoiding inequities and to correct actual or potential loopholes.

One measure originating in the Senate required that the payment for fluid milk to producers by distributors shall be on the basis of both fat and skim. Hearings were held in anticipation of the effective date of the statute in September, and the separate price schedules adopted. Provision was also made whereby producers would be paid for fluid cream in accordance with usage, regardless of the area in which it was sold.

Another bill, designed primarily to provide for giving consideration to volume of delivery in pricing the wholesale and retail deliveries, and also to re-evaluate distributor margins, proved to have many more complicating features than were evident at the time that the bill was in process through the Legislature.

Because of certain language omissions, grave doubt has arisen whether producer prices can be modified and the change passed through into wholesale and retail

price modifications, without fulfilling the obligation to complete new surveys on distributor costs and margins in each of the 37 milk marketing and stabilization areas. If possible, a special session amendment will be sought in 1956.

Special attention has been given to development of regulations governing the financing operations utilized by milk distributors in their active competition to gain outlets for their particular supply. Because the fair trade practice provisions of the Milk Control Law were heretofore believed to be insufficiently explicit to cover the several undesirable practices, an implementing amendment was suggested to the 1955 Legislature and was enacted. This development made possible the modernization of the regulations governing the financing and fair trade practice phases of Milk Control Law administration.

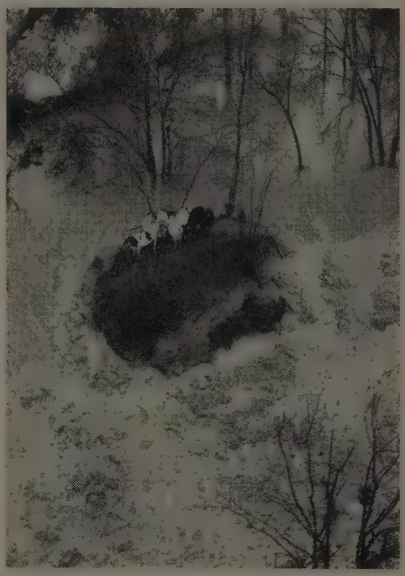
School Milk Program

Although actual administration of the special school milk program resides in the California Department of Education, there has been effective cooperation from the Dairy Industry Advisory Board in promoting a sounder basic schedule for the utilization of federal funds made especially available by act of Congress to bring special milk servings to pupils. It is too early to predict what the volume of use in the schools will be during the current school term, but it is believed that the new schedule of federal reimbursement will permit well above double the previous year's consumption in the special milk program alone. The department has encouraged this program in order to aid in reducing the market milk surplus, which might otherwise serve as a deterrent to better milk prices to producers.

SPECIAL LIVESTOCK FEED SUPPLY PROJECT

As the year closed, disastrous floods visited northwestern and north central portions of the State. Agricultural losses from high water also were reported from several other Central Valley areas. In the process of developing information for the State Office of Civil Defense on how best to cope with the problem of supplying feed for stranded animals or those removed from normal feed supplies, it became evident that the department could assist by serving as an agent of Civil Defense for utilizing facilities available through the Federal Government, whereby surplus feed grains could be obtained without cost for furnishing to the owners of such isolated animals. The department did in fact make its office and field personnel available to whatever extent necessary to assist Civil Defense in undertaking this responsibility, and by handling the details of the Special Emergency Feed Grain Program.

Although it is too early to know the extent to which this program will be made operative, suffice it to say that surplus barley and corn in storages in Sacramento and Yolo Counties were being moved into Sutter, Yuba, Del Norte and Humboldt Counties where thousands of cattle, sheep and hogs were without feed.



Water cascaded through two breaks in a secondary levee of the Feather River about a half mile south of Nicolaus, isolating seven head of hapless cattle on an island refuge. The loss of cattle in the area as a result of Christmas, 1955, floods was heavy.

This dairy south of Nicolaus, Sutter County, was one of the first to go under when the Feather River broke through its east levee near Nicolaus just before Christmas, 1955.

Especially fine cooperative response was received from county agricultural commissioners and University of California Extension Service representatives in rounding up information and pinpointing areas in dire need. A number of willing individuals, familiar with the situation in the several localities and with the problems confronting producers who would lose their animals by starvation unless suitable supplies could be made available, also rendered valiant assistance.

DEPARTMENT OF AGRICULTURE BUILDINGS

A new building for the Department of Agriculture, associated with the headquarters structure formerly occupied by Motor Vehicles Department and allocated by the Department of Finance for the administrative offices of the department, was almost completely occupied during the year by the department, except for those laboratories requiring special equipment. It is hoped that before the end of the current fiscal year all necessary activities and functions of the department will be housed within this over-all centralized unit.

A new Sacramento Animal and Poultry Disease Diagnostic Laboratory is under construction at a location about 9½ miles south of the center of Sacramento on property acquired for this purpose. Producers, veterinarians and others having disease problems with their herds and flocks can more readily reach this facility and take advantage of the important diagnostic service available than would have been possible at a downtown Sacramento location.

A new plant quarantine border inspection station is being built near Winterhaven, Imperial County, to cover incoming vehicular traffic moving over the new main highway bridge being built near Yuma. This new location will allow more expeditious handling of the inspection work, since it will eliminate the inspection of many local vehicles now passing through the Fort Yuma station.

The mired pasture shown above was typical of the flooded agricultural countryside

A dairyman of East Nicolaus is shown here receiving his supply of mixed grain as emergency feed for his flood-starved herd

COOPERATION

It is a matter of great satisfaction to reiterate the previous year's comment on the effective teamwork of the department's people in recognizing a common objective, namely, service to California's agriculture.

The director is happy to report advantageous cooperation with many other states as a result of having been elected to serve as president of the National Association of Commissioners, Secretaries and Directors of Agriculture. This development also will involve the holding of the association's annual convention in San Francisco during September, 1956.

Good cooperative relations with other Western States have been continued in areas of agricultural problems along with other interstate matters, as a result of the director's serving the California Commission on Interstate Cooperation, first as executive secretary and later chairman. Mr. Chas. V. Dick, Chief of Plant Industry in the department, is currently serving as executive secretary of this important commission.

Excellent assistance has been given to the department by the California State Board of Agriculture, and assistance in legislative matters has been gratefully received from the Joint Interim Committee on Agricultural and Livestock Problems, as well as from the standing committees on agriculture in both houses of the State Legislature and the Committee on Livestock and Dairies in the State Assembly.

Sound relationships have been maintained with other departments of State Government as well as with the several agricultural organizations; and reliance on the effective assistance of associates at the county level, particularly the County Agricultural Commissioners, Sealers, Livestock Inspectors, and Sanitarians in organized health departments, has been rewarded by excellent cooperative services from these several groups.

At the beginning of this report reference was made to the showing which California's agriculture had made in terms of cash receipts from farm marketings. It is hoped that the volume of production will continue to reflect this State's advantageous conditions, so that it can also continue in the first rank in value of production.

A borrowed grinder was used by these farmers in the flooded area to grind their emergency supply of mixed grain for dairy cows flooded out of Nicolaus

These roving cows tried to browse on sour, wet grain damaged by Feather River flood waters which inundated this Yuba area ranch on Christmas Eve

DIVISION OF ADMINISTRATION

Departmental Personnel Office

CHARLES P. CUSICK, *Personnel Officer*

The Personnel Office administers the personnel program for the Department of Agriculture and maintains a roster of employees for payroll purposes, leave and retirement. Of the 222 California civil service job classifications used by this department, 165 are limited to Department of Agriculture functions.

The Personnel Office conducts job classifications studies and salary surveys, investigates cases requiring disciplinary action, assists bureaus with their training programs and maintains training records.

In cooperation with and for California counties, the Personnel Office examines applicants and certifies those found to be eligible for appointment by respective county boards of supervisors to positions as county agricultural commissioners, deputy agricultural commissioners, county sealers of weights and measures, deputy county sealers, county agricultural inspectors and seasonal agricultural inspectors.

SPECIAL FUNCTIONS

Recruitment

Recruitment is a continuous activity of this office. Seasonal employees are required by some bureaus for varied lengths of time throughout the year. In January, 1955, the department's personnel totalled 1,504 employees; in August the total was 2,342. Approximately 1,300 of these were permanent, and the balance were employed on a seasonal basis.

Examining

The following is a resumé of examinations held by this department during 1955, to qualify persons for employment in county agricultural departments and county departments of weights and measures:

	Number of candidates	*Successful*	*Unsuccessful*
County agricultural commissioner Deputy agricultural commissioner	111	48	63
County sealer of weights and measures Deputy sealer of weights and measures	117	64	53
County agricultural inspector	459	201	258
Seasonal county agricultural inspector	45	35	10
Totals	732	348	384

In-service Training

During 1955, considerable training was conducted in the department. Two staff members of the State Personnel Board Training Division conducted a "Train the Trainer Program" designed to prepare additional bureau coordinators to train supervisors in their bureaus. The Personnel Office, working with bureau training coordinators and the state training office, participated in planning, arranging, and conducting department-wide and bureau training programs as follows:

	Number of trainees	*Trainee hours*
Management training for division and bureau chiefs	16	160
Training coordinators workshops	17	532
Training for enforcement officers (San Francisco and Los Angeles)	275	1,100
Public relations training	256	4,064
Total		6,016

During the past year, Personnel Office staff members assisted 12 bureaus in planning and conducting supervisory training courses. The Personnel Office also assisted in planning the public relations course given to employees of the department throughout the State.

Financial Statement

Expenditures for the Fiscal Year July 1, 1954-June 30, 1955

C. H. PERKINS, *Fiscal Officer*

GENERAL FUND FUNCTIONS	Detail	Subtotals	Totals
ADMINISTRATION		$427,220.11	$427,220.11
Administration	$379,433.51		
Office Service Unit	47,786.60		
DIVISION OF PLANT INDUSTRY			2,637,974.85
Administration		15,963.81	
Bureau of Entomology		961,849.11	
General Entomology	217,814.91		
Destruction and Control of Beet Leafhoppers and Host Plants	210,443.72		
Grape Leaf Skeletonizer Eradication	48,076.11		
Mexican Bean Beetle Suppression	23,685.61		
Cherry Fruit Fly Eradication	4,756.81		
Hall Scale Eradication	71,288.56		
Mexican Fruit Fly Survey and Treatment	78,566.89		
Khapra Beetle Suppression	307,216.50		
Bureau of Plant Quarantine		1,058,274.79	
Bureau of Plant Pathology		159,316.98	
Plant Pathology	132,130.36		
Quick Decline of Citrus	27,186.62		
Bureau of Rodent and Weed Control and Seed Inspection		397,751.88	
Rodent and Weed Control	111,570.46		
Seed Inspection	88,707.61		
Predatory Animal Control	197,473.81		
Bureau of Chemistry		44,818.28	
Spray Residue Enforcement	44,818.28		
DIVISION OF ANIMAL INDUSTRY			2,134,703.44
Administration		15,380.32	
Bureau of Livestock Disease Control		1,215,968.49	
Livestock Disease Control	1,024,175 87		
Poultry Pathological Laboratory, Petaluma	47,835.75		
Animal Pathological Laboratory, San Gabriel	55,394.17		
Poultry Pathological Laboratory, Turlock	27,451.10		
Animal Pathological Laboratory, Fresno	54,623.17		
Poultry Pathological Laboratory, Lancaster	6,488.43		
Bureau of Dairy Service		150,014.08	
Bureau of Meat Inspection		753,340.55	
Meat Supervision	109,511.31		
Meat Inspection	643,829.24		
DIVISION OF MARKETING			1,064,305.45
Administration		8,579.37	
Bureau of Markets		242,810.51	
General Marketing Service	242,810.51		
Bureau of Market News		424,997.25	
Supervisory and Field	241,629.81		
Fruit and Vegetable Reporting	94,395.59		
Hay and Grain Reporting	35,605.04		
Livestock, Meat and Wool Reporting	29,923.85		
Dairy and Poultry Products Reporting	23,442.96		
Bureau of Agricultural Statistics		49,062.45	
Bureau of Fruit and Vegetable Standardization		245,282.74	
Fruit and Vegetable Standardization	199,123.07		
Seed Potato Certification	46,159.67		
Bureau of Weights and Measures		93,573.13	
Subtotal—Support			$6,264,203.85
LESS ESTIMATED REIMBURSEMENTS			$583,797.57
Bureau of Markets	$201,744.86		
Bureau of Meat Inspection	37,889.89		
Bureau of Plant Quarantine	3,582.61		
Departmental Administration	210,207.07		
Office Service Unit	46,110.27		
Bureau of Rodent and Weed Control and Seed Inspection	24,310.95		
Bureau of Livestock Disease Control	40,897.33		
Bureau of Market News	15,350.00		
Bureau of Plant Pathology	1,704.59		
Bureau of Entomology—General Entomology	2,000.00		
Total—Support			$5,680,406.28

Expenditures for the Fiscal Year July 1, 1954-June 30, 1955—Continued

DEPARTMENT OF AGRICULTURE FUND FUNCTIONS	Detail	Subtotals	Totals
DIVISION OF PLANT INDUSTRY			$836,203.52
Bureau of Plant Quarantine		$89,867.01	
Nursery Service	$89,867.01		
Bureau of Field Crops		423,972.46	
Bonded Warehouse Inspection	25.41		
Field Crops Inspection	219,113.89		
Grain Warehouse Inspection	3,044.77		
Terminal Weighing Service	340.46		
Commercial Feeding Stuffs Service	201,447.93		
Bureau of Chemistry		294,960.85	
Chemistry†	272,457.32		
Agricultural Pest Control Operators	22,503.53		
Bureau of Rodent and Weed Control		27,403.20	
Seed Inspection and Certification Service	27,403.20		
DIVISION OF ANIMAL INDUSTRY			745,236.42
Bureau of Dairy Service		152,847.17	
Dairy Service	120,036.54		
Testing and Sampling of Fluid Milk	32,810.63		
Bureau of Livestock Indentification		592,389.25	
DIVISION OF MARKETING			3,149,042.28
Bureau of Markets		6,997.07	
Agricultural Producers Marketing Act	6,780.80		
Agricultural Products Marketing Act	216.27		
Bureau of Market Enforcement		222,434.62	
Bureau of Milk Control		785,531.13	
Bureau of Fruit and Vegetable Standardization		461,239.44	
Canning Tomato Inspection	457,965.34		
Winter Seed Potato Test Plot	3,274.10		
Bureau of Shipping Point Inspection		1,522,503.46	
Bureau of Weights and Measures		150,336.56	
Gasoline, Distillate and Oil Inspection and Antifreeze Registration	150,336.56		
Subtotal—Support			$4,730,482.22
LESS ESTIMATED REIMBURSEMENTS			—$6,622.36
Bureau of Milk Control	$6,622.36		
Total—Support			*$4,723,859.86

† Economic poisons, $54,491.46; fertilizing materials service, $217,965.86.
* Includes accounts payable, $229,145.99, and accounts receivable, $3,346.13.

CAPITAL OUTLAY AND SAVINGS FUND	Detail	Subtotals	Totals
CAPITAL OUTLAY			
Major Construction, Improvements and Equipment			$133,457.56
Plant Quarantine Services		$132,558.77	
Yermo	$3.85		
Coleville	—4,045.08		
Fort Yuma	136,600.00		
Fruit and Vegetable Standardization		—832.21	
Banning-Beaumont	—832.21		
Livestock Disease Control		1,731.00	
Lancaster Laboratory	1,731.00		
Minor Construction, Improvements, Repairs and Equipment			17,300.00
Fruit and Vegetable Standardization		17,300.00	
Banning-Beaumont	2,700.00		
Fresno	14,600.00		
Preliminary Plans			—223.52
Plant Quarantine		—223.52	
Fort Yuma	—223.52		
Miscellaneous Improvements, Repairs and Equipment			—464.78
Fruit and Vegetable Standardization		1,073.00	
Banning-Beaumont	1,073.00		
Livestock Disease Control		—1,537.78	
Fresno	—1,537.78		
Acquisition of Real Property			15,628.89
Plant Quarantine Service		14,278.89	
Fort Yuma	13,806.39		
Alturas	472.50		
Livestock Disease Control		1,350.00	
Sacramento Laboratory	1,350.00		
Total—Capital Outlay			*$165,698.15

* Includes expenditures for Capital Outlay, $172,336.74, and returns of unexpended balances of $6,638.59.

Revenue for the Fiscal Year July 1, 1954-June 30, 1955

	Detail	Totals
DEPARTMENT OF AGRICULTURE TRUST ACCOUNT		$208,038.52
Dairy Trust	$208,038.52	
STATE DAIRY PRODUCTS TRUST FUND		433,807.73
Fees	424,467.88	
Interest and Penalties	306.72	
Sale of Books and Pamphlets	8,688.52	
Sale of Records	310.00	
Miscellaneous Income	34.61	
DEPARTMENT OF AGRICULTURE BUILDING FUND		70.78
Surplus Money Investment Fund	70.78	

GENERAL FUND FUNCTIONS	Detail	Subtotals	Totals
DEPARTMENTAL ADMINISTRATION			
Miscellaneous Income	$788.15	$788.15	$788.15
DIVISION OF PLANT INDUSTRY			77.10
Bureau of Entomology		73.00	
Apiary Brand Registration Fees	73.00		
Bureau of Rodent and Weed Control and Seed Inspection		4.10	
Sale of Documents	4.10		
DIVISION OF ANIMAL INDUSTRY			53,594.61
Bureau of Meat Inspection		230.79	
Foreign Cold Storage Meat Inspection—Licenses	170.00		
Foreign Cold Storage Meat Inspection—Fees	60.79		
Bureau of Dairy Service		53,363.82	
Containers—Brand Renewal Fees	805.00		
Container Brand Registration Fees	315.00		
Miscellaneous Dairy Products Factory Licenses	10,426.57		
Miscellaneous Dairy Products Factory Licenses—Penalties	83.25		
Oleomargarine Licenses—Bakery and Restaurant	4,346.00		
Oleomargarine Licenses—Manufacturers	1,200 00		
Oleomargarine Licenses—Wholesale	13,700.00		
Imitation Milk Licenses—Manufacturers	300.00		
Imitation Milk Licenses—Retail	1,420.00		
Imitation Milk Licenses—Bakery and Restaurant	30.00		
Imitation Milk Licenses—Wholesale	850.00		
Imitation Cream Licenses—Wholesale	200.00		
Imitation Cream Licenses—Retail	150.00		
Imitation Cream Licenses—Bakery and Restaurant	106.00		
Imitation Cream Licenses—Manufacturers	700.00		
Imitation Ice Cream Licenses—Manufacturers	500.00		
Imitation Ice Cream Licenses—Retail	8,295.00		
Imitation Ice Cream Licenses—Bakery and Restaurant	12.00		
Imitation Ice Cream Licenses—Wholesale	3,650.00		
Samplers and Weighers Licenses	1,885.00		
Samplers and Weighers Licenses—Penalties	10.00		
Pasteurizers Licenses	2,284.00		
Pasteurizers Licenses—Penalties	21.00		
Testers Licenses	974.00		
Testers Licenses—Penalties	5.00		
Technicians Licenses	100.00		
Licenses—Modified	600.00		
Acidolphus Milk Licenses	100.00		
Miscellaneous	296.00		
DIVISION OF MARKETING			94,942.25
Bureau of Milk Control		100.00	
Dairy Producer Exchange Licenses	100.00		
Bureau of Fruit and Vegetable Standardization		52,400.00	
Seed Potato Certification—Fees	52,400.00		
Bureau of Weights and Measures		42,442.25	
Weighmasters Licenses	24,300.00		
Weighmasters Licenses—Penalties	1,070.00		
Additional Locations Licenses	3,382.50		
Additional Locations Licenses—Penalties	75.00		
Deputies Licenses	13,337.00		
Deputies Licenses—Penalties	261.00		
Miscellaneous	11.50		
Sale of Pamphlets	5.25		
Total—General Fund Revenue			$149,402.11

Revenue for the Fiscal Year July 1, 1954-June 30, 1955—Continued

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF PLANT INDUSTRY				$937,988.45
Bureau of Plant Quarantine			$119,210.35	
Nursery Service		$119,210.35		
Nursery Licenses	$100,398.50			
Nursery Licenses—Penalties	105.00			
Restoration Fees	1,050.50			
Acreage Fees	2,309.50			
Psorosis Registry Fees	460.50			
Strawberry Certification Fees	10,116.95			
Miscellaneous	591.50			
Sale of Automobile	2,165.00			
Interest from Surplus Money Investment Fund	2,012.90			
Bureau of Field Crops			431,676.80	
Field Crops Inspection		242,932.63		
Inspection Fees	238,750.14			
Samples Sold	712.50			
Sale of Automobile	2,230.00			
Interest from Surplus Money Investment Fund	1,239.99			
Warehouse Inspection		386.26		
Warehouse Inspection Licenses	335.00			
Interest from Surplus Money Investment Fund	51.26			
Grain Warehouse Inspection		2,656.97		
Registration Fees	2,630.00			
Interest from Surplus Money Investment Fund	26.97			
Commercial Feeding Stuffs Service		185,321.52		
Sale of Automobiles	2,080.00			
Miscellaneous Collections	160.93			
Feeding Stuffs Service Licenses	16,160.00			
Feeding Stuffs Service Licenses—Penalties	755.00			
Feeding Stuffs Tonnage Tax	163,753.22			
Tonnage Tax—Penalties	684.71			
Interest from Surplus Money Investment Fund	1,727.66			
Terminal Weighing Service		379.42		
Inspection Fees	378.00			
Interest from Surplus Money Investment Fund	1.42			
Bureau of Chemistry			355,479.56	
Economic Poisons Service		83,501.23		
Economic Poisons Licenses	59,700.00			
Economic Poisons Licenses—Penalties	578.55			
Economic Poisons Analysis Fees	18.00			
Limited Use Sales Licenses	2,640.00			
Limited Use Sales Licenses—Penalties	26.10			
Sale of Automobiles	497.50			
Supplemental Brand Fees—Licenses	19,032.00			
Spray Residue Analysis Fees	28.00			
Interest from Surplus Money Investment Fund	334.20			
Miscellaneous	646.88			
Fertilizing Materials Service		248,461.69		
Fertilizer Licenses	17,250.00			
Fertilizer Licenses—Penalties	142.50			
Fertilizer Salesman's Licenses	5,548.00			
Fertilizer Salesman's Licenses—Penalties	218.00			
Agricultural Mineral Licenses	8,600.00			
Agricultural Mineral Licenses—Penalties	40.00			
Fertilizer Users Samples	18.00			
Agricultural Mineral Tonnage Tax	78,349.49			
Agricultural Mineral Tonnage Tax—Penalties	641.40			
Sale of Automobiles	1,692.50			
Jobbers Licenses	300.00			
Miscellaneous	70.15			
Fertilizer Tonnage Tax	130,304.31			
Fertilizer Tonnage Tax—Penalties	462.63			
Interest from Surplus Money Investment Fund	4,824.71			
Pest Control Operators		23,516.64		
Operator's Licenses	18,195.00			
Operator's Licenses—Penalties	430.00			
Pilot's Certificates	4,735.00			
Miscellaneous	40.00			
Interest from Surplus Money Investment Fund	116.64			
Bureau of Rodent and Weed Control and Seed Inspection				
Seed Testing and Certification Service		31,621.74	31,621.74	
Seed Testing Fees	31,564.15			
Interest from Surplus Money Investment Fund	57.59			

Revenue for the Fiscal Year July 1, 1954-June 30, 1955—Continued

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF ANIMAL INDUSTRY				$887,698.56
Bureau of Dairy Service			$149,205.09	
Miscellaneous	$162.50	$162.50		
Interest from Surplus Money Investment Fund	140.29	140.29		
Ice Cream Inspection		64,688.05		
Ice Cream Factory Licenses	63,949.55			
Ice Cream Factory Licenses—Penalties	738.50			
Butter Grading Service		20,428.71		
Butter Graders Licenses	82.00			
Butter Distributors Licenses	52.70			
Butter Distributors Licenses—Penalties	2.25			
Butter Cutting and Wrapping Licenses	20,260.56			
Butter Cutting and Wrapping Licenses—Penalties	31.20			
Market Milk Inspection		58,522.38		
Producers and Distributors Inspection Fees	58,166.45			
Producers and Distributors Inspection Fees—Penalties	355.93			
Glassware Testing Service		5,263.16		
Glassware Testing Fees	2,888.16			
Sale of Automobiles	2,375.00			
Bureau of Livestock Identification			738,493.47	
Proceeds from Estray Animals	9,068.85	9,068.85		
Cancelled Warrants	43.50	43.50		
Interest from Surplus Money Investment Fund	4,812.31	4,812.31		
Cattle Protection Service		723,506.81		
Hide and Brand Inspection Fees	631,387.91			
Brand Recording Fees	5,290.00			
Brand Reinstatement Fees	2,652.00			
One Year Brand Renewal Fees	41,186.00			
Brand Renewal Fees—Multiple Year	14,708.00			
Duplicate Certificate Fees	26.00			
Brand Transfer Fees	1,008.00			
Sale of Automobiles	1,860.00			
Transportation Licenses				
Slaughterers Licenses	16,485.00			
Public Cattle Sales Yard Licenses	7,400.00			
Public Cattle Sales Yard Licenses—Penalties	74.00			
Penalties for Use of Unrecorded Brands	1,415.00			
Miscellaneous	14.90			
Horse and Sheep Protection		1,062.00		
Brand Transfer Fees	12.00			
Horse Transportation Licenses	120.00			
Slaughterers Licenses	930.00			
DIVISION OF MARKETING				3,220,020.70
Bureau of Markets			12,728.11	
Agricultural Producers Marketing Act		12,728.11		
Commission Allowance Prorate Fees	12,189.87			
Interest from Surplus Money Investment Fund	538.24			
Bureau of Market Enforcement			271,891.38	
Producers Dealers Service		232,880.80		
Produce Dealers Licenses	167,320.00			
Produce Dealers Licenses—Penalties	1,530.00			
Brokers Licenses	11,800.00			
Commission Merchants Licenses	7,240.00			
Agents Licenses	10,942.50			
Cash Buyers Licenses	33,080.00			
Transcripts	70.80			
Miscellaneous	897.50			
Processors of Farm Products		31,970.50		
Processors Licenses	27,040.00			
Processors Licenses—Penalties	70.00			
Agents Licenses	4,297.50			
Miscellaneous	335.00			
Statement of Intention to Finance—Fees	228.00			
Sale of Automobiles	3,950.00	3,950.00		
Miscellaneous Income	2.50	2.50		
Interest from Surplus Money Investment Fund	3,087.58	3,087.58		
Bureau of Milk Control			772,446.15	
Fluid Milk and Cream Stabilization		572,890.23		
Distributor and Producer Assessments	552,684.35			
Distributor Licenses	5,025.00			
Distributor Licenses—Penalties	246.00			
Civil Penalties	5,510.50			
Sale of Pamphlets	25.00			
Sale of Automobiles	3,670.00			
Miscellaneous Income	177.90			
Cancelled Warrants	10.00			
Interest from Surplus Money Investment Fund	5,541.48			

Revenue for the Fiscal Year July 1, 1954-June 30, 1955—Continued

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF MARKETING—Continued				
Bureau of Milk Control—Continued				
Fluid Milk and Cream Sales Stimulation		$88,460.48		
San Joaquin Producers Fees	—1,722.23			
Sacramento Producers and Distributors Fees	24,625.78			
Alameda-Contra Costa Producers Fees	61,671.95			
Alameda-Contra Costa Miscellaneous Income	30.00			
San Diego Producers Fees	3,854.98			
Marketing Milk and Other Dairy Products		111,095.44		
Ice Cream Manufacturer Assessments	110,995.44			
Civil Penalties	100.00			
Bureau of Fruit and Vegetable Standardization			$425,773.59	
Canning Tomato Inspection		422,247.05		
Cancelled Warrants	89.77			
Inspection Fees	411,236.16			
Inspection, Ch. 66/51	6,949.23			
Interest from Surplus Money Investment Fund	3,971.89			
Seed Potato Test Plots		3,526.54		
Test Plot Fees	3,165.00			
Miscellaneous Income	359.47			
Interest from Surplus Money Investment Fund	2.07			
Bureau of Shipping Point Inspection			1,565,458.25	
Miscellaneous Income	3.45			
Inspection Fees	1,560,319.52			
Cancelled Warrants	2.52			
Interest from Surplus Money Investment Fund	1,742.76			
Sale of Automobiles	3,390.00			
Bureau of Weights and Measures			171,723.22	
Gasoline, Distillate and Oil Inspection		168,873.22		
Motor Fuel Pump Licenses	166,856.00			
Miscellaneous Income	28.00			
Interest from Surplus Money Investment Fund	1,989.22			
Registration of Antifreeze		2,850.00		
Registration Fees	2,750.00			
Registration Fees—Penalties	40.00			
Miscellaneous Income	60.00			
Total—Revenue for the Department of Agriculture Fund				$5,045,707.71

Department of Agriculture Building Fund for the Fiscal Year July 1, 1954, to June 30, 1955

	Amount
Balance forwarded from 1953-54 F. Y.	$24,408.19
Transferred from Department of Agriculture Fund per Ch. 11/50	
Revenue from Surplus Money Investment Fund	14.48
1953-54 Revenue from Surplus Money Investment Fund Collected in 1954-55 F. Y.	56.30
Expenditures	
Balance as of June 30, 1955	$24,478.97

Appropriations From General Fund for the Fiscal Year July 1, 1954, to June 30, 1955

GENERAL FUND	Balance as of June 30, 1954	Available	Expenditures July 1, 1954 June 30, 1955	Less reimbursement balance	Prior expenditures	Add prior year reimbursements	Transfers and lapsed appropriations	Balance as of June 30, 1955
Support—Departent of Agriculture, Ch. 1/54, Item 32, 1954-55 F.Y.		$5,701,794.00						
Augmented by Executive Orders: E55-22		61,346.00	$5,452,244.77					
Estimated Reimbursements:								
Departmental Administrative Charges		201,745.00	201,745.00					
Office Service Unit		46,488.00	46,110.27	$377.73				
Central Supplies		10,007.00	8,462.07	1,544.93				
Bureau of Plant Quarantine		3,650.00	3,582.61	67.39				
Bureau of Meat Inspection		41,043.00	37,889.89	3,153.11				
Bureau of Livestock Disease Control Pullorum and Paratyphoid Testing		39,757.00	40,897.33	−1,140.33				
Bureau of Markets		203,027.00	201,744.86	1,282.14				
Bureau of Rodent and Weed Control and Seed Inspection		29,000.00	24,310.95	4,689.05				
Bureau of Market News		15,350.00	15,350.00					
General Entomology		2,000.00	2,000.00					
Bureau of Plant Pathology		1,704.00	1,704.59	−59				
Totals		$6,356,911.00	$6,036,042.34	$9,973.43				$310,895.23
Federal Cooperative Marketing Research, Ch. 1/54, Item 40		$70,000.00	$57,364.23					$12,635.77
Moving Expense, Ch. 1/54, Item 41		22,605.50	12,201.62					10,403.88
Moving Expense, Item 42	$22,660.94		55.44				*$22,605.50	
Salaries of County Agricultural Commissioners, Ch. 1/54, Item 392		141,162.00	112,313.04					28,848.96
Support—Department of Agriculture, Ch. 971/53, Item 40, 1953-54 F.Y.	442,963.66				$137,793.47	$5,206.48		310,376.67
Federal Cooperative Marketing Research, Ch. 971/53, Item 41	12,536.13				3,587.60			8,948.53
Salaries of County Agricultural Commissioners, Ch. 971/53, Item 414	38,862.47				37,686.32			1,176.15
Raisin Survey, Ch. 971/53, Item 286	2,391.04							2,391.04
Raisin Survey, Ch. 1712/53	4,272.38		28.42		193.69			4,050.27
South San Francisco Livestock Market News Service, Ch. 1520/53	1,366.54							1,366.54
Support—Department of Agriculture, Ch. 3/52, Item 41, 1952-53 F.Y.	283,938.38				79.32		284,017.70	
Federal Cooperative Marketing Research, Ch. 3/52, Item 42	18,100.20						18,100.20	
Salaries of County Agricultural Commissioners, Ch. 3/52, Item 436	187.63						187.63	
Executive Order E53-3, Ch. 3/52, Item 289, 1952-53 F.Y.	1,461.70						1,461.70	
Executive Order E53-21, Ch. 3/52, Item 290, Sacramento Animal and Poultry Disease Laboratory	561.82						561.82	
Totals	$829,302.89	$6,590,678.50	$6,218,005.09	$9,973.43	$179,181.76	$5,206.48	$326,934.55	$691,093.04

* Balance reappropriated in Budget Act of 1954, Item 41.

Appropriations From Capital Outlay and Savings Fund for the Fiscal Year July 1, 1954, to June 30, 1955

	Balance as of June 30, 1954	Available	Expenditures July 1, 1954 to June 30, 1955	Prior year expenditures	Transfers and lapsed appropriations	Balance as of June 30, 1955
Minor Construction, Improvements and Repairs and Equipment, Ch. 1020/51, 1951-52 F.Y., Item 271	$175.59				$175.59	
Major Construction, Improvements and Equipment, 1953-54 F.Y., Ch. 2/50, Item 281	134.77				134.77	
Major Construction, Improvements and Equipment, Truckee Wye, Ch. 2/50, Item 282	160.09				160.09	
Executive Order E3057, Ch. 145/46 and 1020/51, San Gabriel Pathological Laboratory	2,975.04				2,975.04	
Executive Order E50-41, Ch. 145/46 (IES) Fresno Pathological Laboratory	292.10				292.10	
Executive Order E50-59, Ch. 145/46, Tulelake, Peavine and Hornbrook	324.22				324.22	
Executive Order E51/79, Ch. 145/46, Daggett	241.81				241.81	
Executive Order E51-639, Ch. 1020/51, Item 362.4, Meyers	67.09				67.09	
Construction, Improvements, Repairs and Equipment, Ch. 700/49, Item 282, Ch. 1020/51, Section 3	767.68				767.68	
Major Construction, Improvements, Repairs and Equipment, Ch. 3/52, Item 294, Tulelake	18,895.75				18,895.75	
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Peavine	13,269.82				13,269.82	
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Yermo	23,470.30		$3.85		23,328.91	$137.54
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Coleville	10.58					10.58
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Alturas	750.00					750.00
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Benton	2.47					2.47
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294, Banning-Beaumont	250.00					250.00
Minor Construction, Improvements and Equipment, Ch. 3/52, Item 295	5,432.82				5,195.89	236.93
Executive Order E52-550, Ch. 1020/51, Item 362.4	1,398.20					1,398.20
Executive Order E52-500, Ch. 42/50	190.74				190.74	
Acquisition of Real Property Ch. 971/53, Item 287	1,350.00		1,350.00			
Executive Order E52-378, Item 362.3	488.51				488.51	
Executive Order E52-256, Ch. 42/50	6,284.85				6,284.85	
Minor Construction, Improvements and Equipment, Ch. 1/54, Item 284		$17,300.00	16,467.79			832.21
Executive Order E54-214		1,073.00	1,073.00			
Minor Construction and Equipment Executive Order E362.3, Ch. 1020/51			—4,045.08			4,045.08
Miscellaneous Repairs, Improvements and Equipment, Executive Order E53-415			—1,537.78			1,537.78
Executive Order E54-36, Ch. 971/53, Item 392			223.52			223.52
Acquisition and Development of Plant Quarantine Station Site near Fort Yuma, Ch. 1/54, Item 281		15,000.00	13,806.39			1,193.61
Acquisition of Real Property, Ch. 1/54, Item 282		750.00	472.50			277.50
Major Construction, Improvements and Equipment, Ch. 1/54, Item 283		137,800.00	136,600.00			1,200.00
Construction of Poultry Disease Diagnostic Laboratory, E. O. E55-33, Ch. 971/53, Item 393		1,731.00	1,731.00			
Totals	$76,932.43	$173,654.00	$165,698.15		$72,792.86	$12,095.42

Appropriations From Department of Agriculture Fund for the Fiscal Year July 1, 1954, to June 30, 1955

	Balance as of June 30, 1954	Available	Expenditures July 1, 1954 to June 30, 1955	Less reimbursement balance	Prior year expenditures	Transfers and lapsed appropriations	Balance as of June 30, 1955
Support—Department of Agriculture Fund, Ch. 1/54, 1954-55 F.Y., Item 42		$4,756,507.00					
Augmented by Executive Order: D54-105		90,000.00	$4,498,060.00				
Estimated Reimbursements, Bureau of Milk Control		10,000.00	6,627.21	$3,372.79			
Totals		$4,856,507.00	$4,504,687.21	$3,372.79			$348,447.00
Support—Bureau of Dairy Service, Ch. 3/52, 1952-53 F.Y., Item 44.5	$81.01					$81.01	
Support—Department of Agriculture Fund, Ch. 971/53, 1953-54 F.Y., Item 43	380,710.49				$189,478.83		$191,231.66
Support—Department of Agriculture Fund, Ch. 3/52, 1952-53 F.Y.	62,497.34				46.76	62,450.58	
Support—Department of Agriculture Fund, Ch. 1020/51, Item 42, 1951-52 F.Y.	3,062.11				1,145.28	*- 38.90	1,955.73
Totals	$446,350.95	$4,856,507.00	$4,504,687.21	$3,372.79	$190,670.87	$62,492.69	$541,634.39

* Revised appropriation.

Reconciliation of Appropriation Balances for the Fiscal Year July 1, 1954, to June 30, 1955

GENERAL FUND	Available	Actual expenditures	Less reimbursements	Balance financial statement	Less accounts payable	Add accounts receivable	Balance per budget report	Add items in transit	Balance per controller's books
Support—Department of Agriculture, Ch. 1/54 1954-55 F.Y., Item 39	$6,356,911.00	$6,036,042.34	$9,973.43	$310,895.23	$230,662.77	$2,501.26	$82,733.72	$248,555.72	$331,289.44
Federal Cooperative Marketing Research 1954-55 F.Y., Item 41	70,000.00	57,364.23		12,635.77	9,831.28	7,582.89	10,387.38	—10,378.19	9.19
Moving Expense, Ch. 1/54, 1954-55 F.Y., Item 41	22,605.50	12,201.62		10,403.88			10,403.88	3,145.78	13,549.66
Salaries of County Agricultural Commissioners, Ch. 1/54, 1954-55 F.Y., Item 392	141,162.00	112,313.04		28,848.96	25,112.00		3,736.96	41,986.01	45,722.97
Totals	$6,590,678.50	$6,217,921.23	$9,973.43	$362,783.84	$265,606.05	$10,084.15	$107,261.94	$283,309.32	$390,571.26

DEPARTMENT OF AGRICULTURE FUND	Available	Actual expenditures	Less reimbursements	Balance financial statement	Less accounts payable	Add accounts receivable	Balance per budget report	Add items in transit	Balance per controller's books
Support—Department of Agriculture Fund, Ch. 1/54, 1954-55, Item 42	$4,856,507.00	$4,504,687.21	$3,372.79	$348,447.00	$229,145.99	$3,346.13	$122,647.14	$330,606.47	$453,253.61

Statement of Collections and Expenditures for the Fiscal Year July 1, 1954, to June 30, 1955

DEPARTMENT OF AGRICULTURE FUND	Balance as of June 30, 1954	Collections		Other items		Expenditures		Transferred by Controller to State Employees' Retirement Fund	Balance as of June 30, 1955
		1954-55	1955-56			July 1, 1954 to June 30, 1955	Prior year expenditures		
Nursery Service	$222,301.86	$67,241.85	$70,087.25	[3]$22.54		$86,787.94	$1,923.43	$4,838.31	$266,103.82
Bonded Warehouse Inspection	5,509.58	386.26		.63	[4] $18.01	25.41	—6.34	.14	5,859.25
Field Crops Inspection	120,139.59	242,932.63		15.98		205,400.19	7,846.01	10,629.73	139,212.27
Grain Warehouse Inspection	3,107.44	2,656.97		.50		3,038.82	16.26	228.74	2,481.09
Commercial Feeding Stuffs Service	196,489.36	185,321.52		26.36		195,445.39	2,492.61	12,378.90	171,520.34
Terminal Weighing Service	52.66	379.42		.13		340.46	5.16		86.59
Economic Poisons Service	22,774.49	58,532.23	21,012.00	1.27		53,215.97	1,326.56	4,337.19	43,440.27
Fertilizing Materials Service	524,614.94	243,511.69	5,175.00	62.84		212,865.47	5,302.25	12,953.15	542,243.60
Agricultural Pest Control	10,832.07	23,516.64		1.60		21,573.70	316.33	1,344.11	11,116.17
Seed Testing and Certification	2,726.91	31,621.74		.68		24,634.82	3,942.22	1,664.94	4,107.35
Bureau of Dairy Service	52,762.61	149,205.09		6.94		116,876.78	1,350.28	7,123.40	76,624.18
Livestock Identification	485,894.33	738,093.47		51.92		578,198.41	13,927.32	34,361.00	597,552.99
Bureau of Milk Control	667,512.75	772,446.15		78.75	[2]7,004.09				592,056.49
Milk Control						746,822.97	39,956.62	33,609.90	
Dairy Service						32,327.90	160.09	2,107.77	
Agricultural Products Marketing Act	229.53					216.27		13.26	
Agricultural Producers Marketing Act	52,409.22	12,728.11		6.43		6,675.80	124.64	333.88	58,009.44
Bureau of Market Enforcement	322,079.27	264,156.88		37.04		215,762.31	5,802.37	11,944.72	352,763.79
Canning Tomato Inspection	464,530.77	422,247.05		56.10	[5]—6,949.23	448,241.48	4,186.21	7,949.79	419,507.21
Canning Tomato Inspection, Ch. 66/51	—6,949.23				[6]6,949.23				
Seed Potato Testing	—378.61	3,526.54		.05		3,257.10	36.41	112.26	—257.79
Shipping Point Inspection	196,584.54	1,565,458.25		21.69		1,405,260.22	101,522.57	55,332.38	199,949.31
Gasoline, Distillate and Oil Inspection	255,325.25	68,049.22	120,172.00	22.47		147,710.07	881.48	8,874.64	286,102.75
Totals	$3,598,549.33	$4,852,011.71	$216,446.25	$413.92	$6,986.08	$4,504,677.48	$191,112.48	$210,138.21	$3,768,479.12
Less: Transfer to Department of Agriculture Building Fund, Ch. 11/50	$661,168.00				$1,200,000 00				$1,861,168.00
	$2,937,381.33								$1,907,311.12

[1] Payment on loan.
[2] Estimated reimbursements.
[3] Interest from surplus money investment.
[4] Warehouse loan.
[5] Transfer to Ch. 66/51.
[6] Transfer from canning tomato.

Statement of Revenue and Expenditures, Department of Agriculture Trust Account, July 1, 1954, to June 30, 1955

	Balance as of June 30, 1954	Collections July 1, 1954 to June 30, 1955	Expenditures	Transfer to State Employees' Retirement System	Balance as of June 30, 1955
BUREAU OF DAIRY SERVICE TRUST PROJECTS					
San Joaquin-Sacramento Valley Market Milk Distributors	$2,269.73	$5,186.00	$4,385.31	$213.72	$2,856.70
South San Joaquin Operators	11,711.00	31,836.77	26,641.10	1,709.87	15,196.80
Northern Counties Operators	1,092.48	1,496.61	2,217.26	92.16	279.67
Fresno County	730.31	5,700.00	5,791.84	427.44	211.03
Humboldt County and Del Norte County Operators	9,511.79	16,973.31	16,385.27	951.64	9,148.19
Coast Region Manufacturing Concerns	9,116.51	11,937.17	8,008.29	390.11	12,655.28
Sacramento Valley Operators	5,286.87	29,107.44	26,957.64	1,661.74	5,774.93
North San Joaquin Operators	25,750.18	69,745.61	73,703.67	4,682.26	17,109.86
San Francisco Bay Area Milk Dealers	2,876.82	5,560.00	6,074.48	298.38	2,063.96
Milk Dealers and Distributors in Southern California Area	2,421.22	7,938.00	6,746.77	427.44	3,185.01
Northern and Central California Milk Products Processors	1,678.76	3,875.00	4,218.54	308.19	1,027.03
Salinas-San Luis Obispo Operators	2,832.86	8,612.61	7,453.31	427.44	3,564.72
Total	$75,278.53	$197,968.52	$188,583.48	$11,590.39	$73,073.18
BUREAU OF RODENT AND WEED CONTROL AND SEED INSPECTION					
California Crop Improvement Association	$2,624.41	$9,925.00	$10,375.75	$526.94	$1,646.72
BUREAU OF CHEMISTRY, SPRAY RESIDUE INSPECTION TRUST PROJECTS					
General Spray Residue Trust Project	$9,209.76	$145.00	$280.03		$9,074.73
San Diego Spray Residue Trust Project	1,437.64				1,437 64
Los Angeles County Region Spray Residue Trust Project	1,585.20		290.01		1,295.19
Total	$12,232.60	$145.00	$570.04		$11,807.56
Grand Total	$90,135.54	$208,038.52	$199,529.27	$12,117.33	$86,527.46

Statement of Expenditures and Collections, State Dairy Products Trust Fund, July 1, 1954, to June 30, 1955

	Balance as of June 30, 1954	Collections	Expenditures		Prior year	Transfer to State Employees' Retirement System		Balance as of June 30, 1955
			Advisory Board	Department of Agriculture		Advisory Board	Department of Agriculture	
CALIFORNIA DAIRY INDUSTRY ADVISORY BOARD Section 746.3, Agricultural Code	$246,238.49	$433,807.73	$324,532.98	$13,386.41	$44,526.62	$2,317.15	$417.85	$294,865.21

	Balance as of June 30, 1954	Collections	Other items	Expenditures	Pro-rata refund	Distribution of pool sales proceeds	Agriculture Prorate Advisory Commission fees	Balance as of June 30, 1955
CALIFORNIA MARKETING ACT								
Fresh Bartlett Pears	$23,879.98	$25,839.50	[4]— $1,270.50	$24,731.06				$23,717.92
Canning and Freezing Cling Peaches								
Administration	2,053.91	525,510.32	[2]—60,000.00 [5]100.00 [1]30,000.00	484,732.47				12,931.76
Advertising	257,020.19	1,181,731.29	[5]50.00	1,205,150.81				233,650.67
Cling Peach Crop Survey				227.72				—227.72
Cling Peach Stabilization Program		163,512.25				$163,512.25		.00
Dates	727.16	2,946.91		250.88				3,423.19
Sub-Standard Date Pool	687.35	758.52						1,445.87
Wine	664,802.44	2,013,407.75	[3]—550.00	1,858,833.06				818,827.13
Grapefruit Advisory Board	17,769.80	23,371.10		19,625.09				21,515.81
Fresh Fall and Winter Pears								
Administration	656.49	6,578.22		6,043.26				1,191.45
Sales Promotion	2,688.91	29,114.32		27,115.39				4,687.84
Canning Fall and Winter Pears	5,647.44	26,211.38		23,694.42	4,725.09			3,439.31
Dry Pack Lettuce	2,956.47	41,179.42		41,518.67				2,617.22
Grapefruit Industry Board								
Administration and Operation	1,353.27	—6.41		1,346.86				.00
Advertising and Trade Promotion	3,799.74	4.33		37.28				3,766.79
Marketing Order for Figs								
Administration	16,744.68	52,895.62	[3]—100.00	48,212.95				21,327.35
Advertising	18,103.17	42,351.71		56,207.82				4,247.06
Poultry Improvement								
Administration	3,975.67	34,040.71	[5]575.00	36,543.65				2,047.73
Field Service	3,254.30	88,388.67	[3]— 100.00 [1]5,000.00	95,694.54				848.43
California Canned and California Green Olives	166,092.06	366,620.42	[5]150.00	346,456.25				186,406.23
Coachella Valley Green Corn	562.61			50.97				511.64
Turkey Breeding	7,520.74	10,413.43		15,290.45				2,643.72
Marketing Order for Prunes	120,964.72	465,543.80		486,530.50				99,978.02
Early Apples	194.53	22,236.51	[3]—100.00 [1]4,200.00	24,913.95				1,617.09
Wine Processors	632.14							632.14
Raisins	70,340.43	358,920.62	[3]—600.00 [5]20.00	363,632.23				65,028.82
California Fresh Plums	66.73	27,821.13	[1]3,000.00	30,735.49				172.37
Grape Stabilization	1,481.64							1,481.64
California Fresh Peaches	12,268.49	97,708.66	[3]—20.00	94,166.16				15,790.99
Fresh Bartlett Pear Sales—Promotion	20,584.06	146,739.78	[1]1,270.50 [3]—50.00	128,840.09				39,704.25
Lima Beans	58,241.07	113,551.53		121,980.92				49,811.68
Bedding Plants	10,573.48	38,850.99	[5]120.00	49,198.26				346.21
Lemon Crop Survey		9,200.00		3,789.37				5,410.63
Lemon Stabilization Pool								
Processing Charges		76,818.79	[7]—33,303.25			43,515.54		.00
Pool Proceeds	198,475.04	93,827.10	[7]33,241.15			292,240.04		33,303.25

Lemon Products Administration	47,593.54	487,398.15	[7]330,791.08 [2]—11.73	731,802.70	23,342.61			110,825.73
Advertising	541,617.71	700,740.37	[7]—330,728.98	911,317.96	311.14			.00
Turkey Promotion	15,032.59	89,098.93		97,650.97				6,480.55
Extracted Honey	11,457.77	33,511.55	[3]—418.00	40,825.77				3,725.55
Olive Stabilization	5,292.27	288.34			4,913.17			667.44
Winter Head Lettuce Preliminary Deposit	39.90							39.90
Long White Potatoes	58,639.86	443,088.95	[6]—3,500.00 [2]—10,000.00	359,538.44				128,690.37
Delta White Potatoes	2,827.21	10,828.37		6,309.61	2,628.90			4,717.07
Fresh Asparagus	5,639.99	28,969.32	[6]—1,500.00	17,858.64				21,250.67
Processing Asparagus	44,933.44	62,951.93	[6]—1,500.00	31,302.66				75,082.71
Processing Tomatoes	2.44							2.44
Bush Berries for Processing	207.64	6,292.98	[6]—1,502.00 [1]10,000.00	8,214.87				6,783.75
Preliminary Deposits: Northern California Potatoes	1,212.18			1,212.18				.00
Fresh Plums—Sales Promotion Nationwide		4,704.44		2,479.68				2,224.76
Hardy Pear Promotion		1,500.00		1,284.01				215.99
Strawberry Preliminary		4,000.00		3,366.34				633.66
Cantaloupes		1,800.00		1,243.60				556.40
Totals	$2,428,615.25	$7,961,261.70	—$26,736.73	$7,803,758.03	$35,920.91	*$499,267.83		$2,024,193.45
AGRICULTURAL PRODUCERS MARKETING ACT								
Pear Crop Survey	$170.29	$11,345.12	[8]—$10,597.89	$300.10				$617.42
Canning Bartlett Pear Zone 1 Administration	8,165.40	210,947.14	[9]7,500.00 [10]242.72	164,934.45			$10,547.27	51,373.54
Sales Stimulation	34,381.29	159,257.80	[9]—7,500.00 [1]10,000.00	140,414.98			1,592.60	44,131.51
Substandard Pool for Figs	87,321.54	152,365.74	[2]—10,000.00 [5]—5.00	24,173.84		$194,807.63		20,700.81
Asparagus	957.23							957.23
Marketing Program For Figs Unclaimed Checks	2.92		[11]—2.43 [12]—.49					.00
Totals	$130,998.67	$533,915.80	—$10,363.09	$329,823.37		$194,807.63	$12,139.87	$117,780.51
Totals—Marketing Trust Account	$2,559,613.92	$8,495,177.50	—$37,099.82	$8,133,581.40	$35,920.91	$694,075.46	$12,139.87	$2,141,973.96

* Refund of $163,512.25 stabilization assessment collections.
[1] Bank loan.
[2] Return of bank loan.
[3] Travel advance.
[4] Transfer to sales promotion.
[5] Return of travel advance.
[6] Refund of preliminary deposit.
[7] Revenue transfer.
[8] Transfer to RMA.
[9] Share of expenses.
[10] Unclaimed checks.
[11] Reclaimed checks.
[12] Checks reverting.

Division of Animal Industry

DR. J. E. STUART, *Chief*

The functions of this division are carried on by five bureaus, namely: Livestock Disease Control, Livestock Identification, Meat Inspection, Dairy Service and Poultry Inspection.

On October 5, 1955, the establishment of the Bureau of Poultry Inspection was approved, and on December 2, 1955, the position of Chief, Bureau of Poultry Inspection was created.

The primary responsibilities of the division are:

1. Administration and enforcement of those provisions of the Agricultural Code which relate to prevention, control and eradication of communicable diseases of livestock and poultry. This is accomplished by enforcement of laws and regulations pertaining to the introduction of livestock and poultry, quarantines, diagnostic tests, vaccinations and inspections. The three major disease control projects, on a state-wide basis, are tuberculosis eradication and brucellosis control in cattle and vesicular exanthema control in swine.

2. The enforcement of standards relating to wholesomeness and quality of milk and milk products. The prevention of deception in the advertising and sale of dairy products and of fraudulent practices in the purchase of milk and cream.

3. Administration and enforcement of those provisions of the Agricultural Code which require that slaughtering and processing of meat and meat food products in counties of over 28,000 population be done in establishments operating under federal, state or state-approved meat inspection. Maintain standards for sanitary construction of meat packing establishments and prevent deception and fraudulent practices pertaining to labeling of meat products.

4. Recording of livestock brands, inspecting cattle for ownership when sold and slaughtered; investigation of livestock and the prosecution of offenders.

5. The enforcement of the licensing and sanitation provisions of the Agricultural Code pertaining to plants slaughtering poultry and rabbits and processing the meat thereof, as well as the training and licensing of poultry meat inspectors and the inspection and proper marking of poultry and rabbit meat for wholesomeness.

DIVISION OF
ANIMAL INDUSTRY

DR. JAMES E. STUART, *Chief*

Dairy Service
Livestock Disease Control
Livestock Identification
Meat Inspection
Poultry Inspection

Bureau of Dairy Service

O. A. GHIGGOILE, *Chief*

A. E. REYNOLDS, *Assistant Chief*

The Bureau of Dairy Service has direct responsibility for enforcement of the provisions of Chapters 1 through 10, inclusive, Division 4, of the Agricultural Code of California, and rules and regulations promulgated thereunder.

Market Milk Program

It is the responsibility of the bureau to supervise the activities of approved milk inspection services upon which 498 surveys and investigations were made during 1955. At the beginning of the year, there were 48 cities or counties maintaining milk inspection services by virtue of department approval. However, there were only 46 at the close of the year: the city of Livermore surrendered its certificate, and the County of Lassen repealed its milk inspection ordinance.

Inspection of dairy farms and distributors of market milk, in areas where approved milk inspection services are not maintained, is under the direct supervision of the department. Provision is made by law for the Director of Agriculture to establish graded milk inspection services where milk inspection by local services is not available. Following repeal of the Lassen County ordinance, producers and distributors applied to the department for an established milk inspection service. Such service was granted, making Lassen County the twenty-second county in which the State conducts graded milk inspection.

Lack of personnel and equipment at the Sacramento laboratory makes it necessary for the bureau to contract with private laboratories for required laboratory analyses on samples of market milk produced in established milk inspection areas. There are at the present time four laboratories under contract with the department, which conducted 15,890 bacteriological and chemical determinations on 6,816 samples of market milk and cream during 1955. In addition to these samples, 10,726 were collected and forwarded to the Sacramento laboratory; 19,855 labels for market milk were also examined for accuracy. In addition to laboratory analysis, certain field tests were made to determine quality and composition of the products. Such tests, made during 6,543 inspections of market milk dairies, consisted of 514 lactometer readings, 9,929 flavor and odor tests, 5,947 sediment tests, 7,268 temperature tests and 97 phosphatase tests.

Supervision of technicians, who perform bacteriological examinations of milk and cream purchased on the basis of bacteria count, is the responsibility of the bureau. At the close of 1955 there were 89 licensed technicians upon whom 25 investigations had been made to determine accuracy of their work.

A Bureau of Dairy Service inspector is shown here applying a white cotton disc to the head of a sediment gun. The test is accomplished by drawing a pint of milk from the bottom of the can and forcing it through the disc. The amount of sediment present is observed and compared to standards for classification. Hundreds of thousands of such tests are made annually to assure that milk is clean before processing. All milk which falls outside strict state standards is rejected for human consumption and marked with a blue dye. Condemned milk may be used for livestock feed.

Employees working in laboratories maintained by approved milk inspection services must qualify by an examination pertaining to chemical and bacteriological tests of milk and cream. Successful applicants are issued certificates of proficiency in market milk analysis. Thirty-three such certificates were issued during 1955. There were 101 checks and examinations made on holders of such certificates and 507 investigations of laboratory equipment.

Receiving Point Inspection

Quality determinations on milk and cream produced for manufacturing purposes are made on milk by the use of the direct microscopic count, sediment tests, temperature and odor tests, and on cream by the modified volumetric acidity tests, sediment tests and flavor and odor tests.

The combined odor-bacteria technique of identifying poor milk has been developed by bureau field men to the point where results are remarkably accurate. The odor test is both simple and rapid, consisting of smelling the inside of the can lids immediately after they are opened and before being emptied. All milk with an off odor is set aside. Since certain bacterial conditions produce characteristic odor in milk, these cans are sampled and subjected to direct microscopic examinations. The advantage of this method of milk quality examination lies in the fact that poor milk is kept out of the total supply of dairy products.

During the year there were 2,957,424 lots of milk and cream upon which quality determinations were made, which included 136,667 microscopic examinations, 1,102,643 temperature tests, 772,576 flavor and odor tests, 705,519 sediment tests and 3,228 acidity tests. Financing of this work, for which 26 dairy inspectors are employed, is made possible through voluntary trust fund agreements between dairy product processors and the department. A total of 2,728 visits were made to milk product plants for quality determinations on milk and cream and 39,142 inspections and visits were made to dairy farms. The sale of milk and cream was suspended from 62 dairies until restored to a sanitary condition. As the result of quality determinations on milk and cream, there were 25,102 lots of milk representing 1,703,281 pounds, and 32 lots of cream representing 1,347 pounds condemned as being unfit for human consumption.

TABLE No. 1

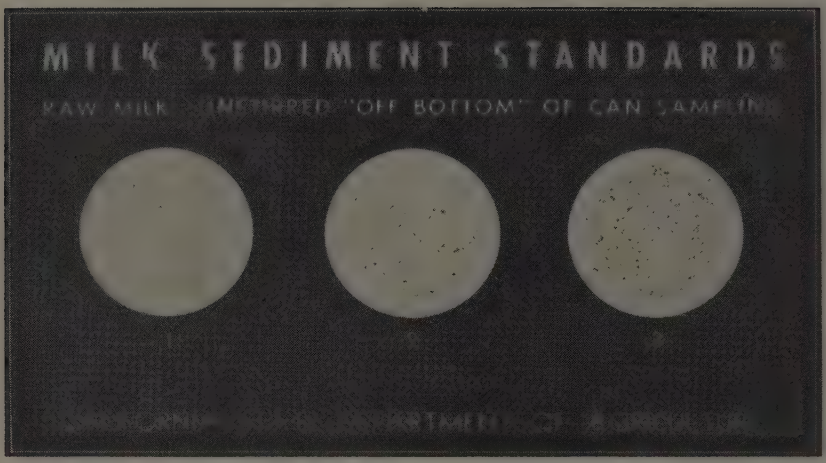
	Pounds of manufacturing milk graded by years	Pounds of manufactured milk rejected as unfit for human consumption	Percent rejected
1950	114,307,056	1,602,245	1.4
1951	83,060,619	1,249,506	1.5
1952	102,465,924	1,446,364	1.41
1953	112,480,167	1,643,448	1.46
1954	157,592,241	1,524,905	.97
1955	156,214,330	1,703,281	1.09

Even though the manufacturing milk quality control program is 30 years old the need for constant vigilance is clearly brought out in the table above. In spite of all the efforts on the part of our inspectors to educate dairy farmers in the methods of clean milk production it is still necessary to reject as unfit for human consumption more than 1 percent of the manufacturing milk examined because it falls short of meeting legal requirements.

Frozen Milk Products Program

The number of firms licensed to manufacture frozen milk products, namely ice cream, ice milk and sherbet, during 1955 was 1,419. Samples of frozen milk products for laboratory analysis are collected at points of manufacture, distribution and retail. All samples are forwarded to the laboratory where they are checked for chemical and bacteriological determinations, with specific reference to bacteria, milk fat, stabilizers and food solids. A total of 7,054 samples were collected for analysis, and 5,477 lots of frozen milk products examined for quality. Considerable time is spent on the advertising and labeling of these products, as indicated by the 18,201 investigations made in 1955. To determine the amount of food solids contained in ice cream and ice milk, it is necessary for the bureau field staff to make accurate weight determinations at the time the product is sampled. During the year weights were made on 4,919 units of ice cream and ice milk. During the year seven manufacturers of frozen milk products applied for and obtained special permits for the use of butter, eggs, or egg products.

That section of the Agricultural Code which requires milk products to be manufactured in a separate room was challenged by distributors of so-called counter freezers, who contended the requirement was un-



The sediment standard shown here is used as a guide to determine the correct classification of the milk tested

constitutional; however, the Los Angeles Superior Court ruled in favor of the department.

Butter Control Program

The control of composition and labeling of butter is based largely on quality determinations and results of laboratory analysis. During the year, 6,823 samples of butter were scored and examined for quality, and 422 samples collected for laboratory analysis. There were also 1,396 lots of butter investigated for correctness of weight, and 5,924 butter brands and labels examined.

Persons in charge of cutting, wrapping, packaging or distributing butter, or their supervisors, must obtain a butter grader's license. At the close of the year there were 81 licensed butter graders upon which 392 checks or examinations were made on the accuracy of their work. It is the responsibility of these licensees to see that the butter is properly labeled according to grade; 15,187 pounds of butter were impounded for failure to meet quality determinations, compared with 10,361 pounds in 1954.

Cheese Control Program

The varieties of cheese other than those defined by law are classified as special varieties and may be sold only after standards of composition and labeling requirements are established by the director after a hearing. At the close of 1955, applications were received for standards and definitions for uncured caciocavallo cheese and mozzarella cheese. Definitions and standards were also requested for creamed cheese and Neufchatel cheese with added fruits, vegetables or meats. A hearing to establish definitions and standards for these products will be held early in 1956.

During 1955 there were 600 samples of cheese products collected for laboratory analysis, and 15,813 labels and brands examined for accuracy. Quality examinations were made on 1,130 lots of cheese resulting in the impounding of 1,210 pounds for failure to meet required standards.

General Products Inspections

Products included in this group are concentrated milk, evaporated milk, condensed milk, both whole and skimmed, powdered whole or skim milk, acidophilus milk, modified milk, buttermilk, cultured buttermilk, nonfat milk, sterilized milk and cream, milk fat, cream dressing, whipped cream topping, eggnog and certain other milk drinks. Samples of these products together with certain ingredients entering into their manufacture are collected for laboratory analysis. A total of 1,825 samples were collected and 7,569 lots examined for quality and labeling. Ninety lots were rejected for failure to meet certain requirements.

Imitation Milk Products Licensing Service

Imitation milk products being sold in California are oleomargarine, imitation milk, imitation cream, imitation ice cream, imitation ice milk, imitation whipped cream topping and powdered imitation milk which is chiefly used for infant feeding generally as prescribed by a physician. There were 824 investigations made concerning imitation milk products.

At the end of the fiscal year ending June 30, 1955, licenses were issued to 10 manufacturers of oleomargarine, 226 to wholesale dealers and 1,750 to bakers and restaurateurs; three to manufacturers of imitation milk, 12 to wholesale dealers, 225 to retailers, and 11 to bakers and restaurateurs; three to manufacturers of imitation cream, two to wholesale dealers, 19 to retailers and 69 to bakers and restaurateurs; seven to manufacturers of imitation ice cream or imitation ice milk, 77 to wholesale dealers and 2,430 to retailers.

Commercial Testing Service

All persons testing, sampling, and weighing milk or cream, for which such tests or weights are used to determine payment, must be examined and licensed by the department. At the close of 1955, there were 808 licensed milk and cream testers and 1,885 licensed samplers and weighers. The work of all active licensed testers is checked at frequent irregular intervals for accuracy. There were 359 checks or examinations conducted on milk and cream testers and 2,300 on samplers and weighers. While checking these licenses, 8,616 samples of milk and cream were collected for testing, and 50,855 pieces of testing apparatus examined for accuracy, of which 562 pieces were condemned as being inaccurate.

During the year 1,756 bulk farm tanks were checked and tested. Tests and weight records at milk products plants are checked frequently to verify correctness of tests and weights given producers of milk and cream. During the year such records were checked at 397 milk products plants, and 417 investigations were made on the sampling of milk and cream.

Dairy Containers Service

It is permissible under the Agricultural Code for persons dealing in milk or milk products or otherwise connected with the dairy industry to register dairy container brands with the department. During the year 46 dairy container brands were registered, and at the close of 1955 there were 885 active certificates of dairy container registrations.

Enforcement of provisions of the Agricultural Code relating to containers marked with the registered brand and users thereof must necessarily be on a self cooperating voluntary basis. There are four such voluntary projects which operate in the Southern California area, the San Francisco Bay area and the Sacramento-San Joaquin Valleys. Three investigators employed on these projects during 1955 made 11,544 visits to various establishments to check containers and were instrumental in returning 17,994 containers to rightful owners. Inspectors also checked the brands and conditions of 551,061 containers; because of faulty conditions 82 were condemned. Bottle exchanges are organized and established throughout the State to facilitate prompt return and shipment of containers from one California area to another. There were 371 investigations made on dairy container exchange operations. Members of the bureau staff associated with the manufacturing milk and cream quality control program are in a postion to render service to the industry in recovering milk cans. This activity resulted in the return of 3,115 milk cans to the proper owners. There were 485,015 milk cans examined for defects of which 4,542 were found defective and therefore condemned.

All dairy containers must be properly washed and sterilized, a process usually performed by mechanical devices; during the year 4,042 inspections were made on such devices.

Since dairy products are perishable, containers must be transported in vehicles kept in a sanitary and clean condition at all times. This accounted for 30,432 inspections of transportation facilities.

Dairy Service Laboratory

The principal activity of the Dairy Service laboratory is examination of milk and milk products by chemical and bacteriological procedure to determine if such products conform to legal standards. During the year, the laboratory tested 14,833 samples of milk and milk products upon which 11,632 chemical and 12,141 bacteriological determinations were made.

Before it can be used in California, glassware used in connection with various methods of testing milk and cream must be

examined for accuracy in the laboratory. There were 24,117 pieces of such glassware examined of which 23,902 pieces were approved and 215 rejected.

General

Many bureau activities are general in character and cannot be reported as a part of any specific function. For example, there were 3,778 visits made to retail establishments to check labeling and quality of milk products, and 13,796 inspections and visits made to milk products plants where 3,898 thermometers were checked for accuracy, and 32,255 thermometer charts examined to see that all required information was shown. There were 1,507 applicants for pasteurizers licenses examined or checked during 1955. By the end of the year a total of 2,256 licenses had been issued to operators of pasteurizing equipment. During the year, 254 H. T. S. T. units were checked and sealed.

TABLE No. 2

Year	New milk houses built (manufacturing milk dairies)	New milking barns built
1950	598	326
1951	642	300
1952	573	243
1953	485	278
1954	584	355
1955	431	253
Totals	3,313	1,755

There are 26 bureau men engaged in manufacturing milk dairy inspection. Constantly trying to improve the sanitary conditions under which milk is produced they have been successful in obtaining the construction of 3,313 new milk houses and 1,755 new barns during the past six years.

In the building program, 882 new milk product plants and dairy farm buildings were constructed, and 1,396 buildings improved. Improvements secured in equipment amounted to 7,329, and 19,064 improvements were obtained in methods. A total of 1,091 chemical tests were made on washing and sterilizing solutions, 80 sterility tests made on equipment, and 1,812 on water supplies.

Members of the bureau continued to assist with instructions conducted by the Dairy Industry Division as well as other divisions of the University of California at Davis, and also assisted with the judging of milk and milk products entries at the California State Fair and district and county fairs. The bureau again supervised operation of the model dairy barn at the State Fair.

In service training courses were held throughout California for state, county and city milk inspectors and sanitarians. Lectures, strip films, slides, demonstrations and panel discussions made up the course. One feature of the instructions was a mobile trailer laboratory, furnished by the United States Public Health Service, which was equipped for milk pasteurization by three of the most commonly known methods.

Bureau of Livestock Disease Control

H. P. BONNIKSON, D.V.M., *Chief* *
H. G. WIXOM, D.V.M., *Assistant Chief*

The Bureau of Livestock Disease Control is concerned with preventing, controlling and eradicating infectious and contagious diseases of livestock and poultry.

Investigations, inspections and diagnostic tests must be made so that diseases may be located and control or eradication measures promptly carried out. The State is divided into 10 districts, with a supervising veterinarian in charge of each. These veterinarians and their staffs, familiar with livestock and poultry conditions and problems in their respective areas, investigate infectious diseases or other troubles which may cause livestock losses, in order that control measures may be started promptly. In addition, a sheep disease and a poultry disease specialist are available to investigate and advise in control and eradication measures. To assist in making and confirming a diagnosis, four general livestock and poultry laboratories and two poultry laboratories are maintained in areas convenient to the livestock industry. The laboratory service is used by members of the industry as well as state and practicing veterinarians.

Practicing veterinarians are required by Section 181 of the Agricultural Code to report communicable diseases promptly to this bureau. Whenever necessary, investigations are made by veterinarians of the bureau in order that diseases may be confirmed and confined or eradicated. A summary of diseases reported is tabulated every four months and published in the "California Veterinarian."

To protect California livestock, certain restrictions govern all livestock imports. In addition, garbage from vessels and aircraft must be incinerated or disposed of at sea. The Bureau of Plant Quarantine cooperates not only by making inspections of livestock at California highway border stations but also of garbage and food disposition at aircraft and maritime ports of entry.

Cattle Scabies Regulation 757, adopted February 1, 1955, requires a permit and treatment of cattle imported from Colorado. The regulation was amended on April 21, 1955, to limit the permit and treatment restrictions to cattle from 10 specified counties in Colorado. No outbreaks of psoroptic or sarcoptic scab occurred during the year.

On October 6, 1955, a revised Official Health Certificate and Test Chart was provided accredited veterinarians for their work with interstate and foreign livestock shipments. The new certificate was based upon recommendations of the United States Livestock Sanitary Association as a standard for all states.

The United States Department of Agriculture, Animal Disease Eradication Branch, cooperates in California disease control projects. Dr. W. A. McDonald is the veterinarian in charge of the California branch.

During the year five veterinarians from Turkey were assigned to the bureau for four months' training in livestock disease control. Each spent two months in field work and two months in a laboratory. Their training was in cooperation with the technical assistance program, United States Department of Agriculture, Foreign Agricultural Service, Foreign Training Division.

GENERAL LIVESTOCK CONTROL PROGRAM

Bluetongue of Sheep

Outbreaks were few and very mild during the year. The disease appeared on July 15, 1955, in Glenn County and the last outbreak was on October 28, 1955, in Fresno County. There were a total of 4,849 sheep involved in eight outbreaks, 156 sheep affected, and 65 deaths were reported. The disease occurred in Calaveras, Fresno, Glenn, Kern, Merced and San Diego Counties. It had not been previously reported in San Diego County.

* Retired January 1, 1956. Dr. H. G. Wixom, Chief effective that date.

Vaccinating was down considerably, to about 25 percent of the flocks throughout the State with the exception of the Colusa area where about 80 percent of the sheep were vaccinated.

Scrapie of Sheep

An outbreak of scrapie in sheep was found on May 10, 1955, on a ranch near Thornton, San Joaquin County. This was the second occurrence of scrapie found in California; in August, 1952, two closely associated flocks in Butte County were found to have scrapie. The infection in those two flocks was regarded as one outbreak and was the second definite diagnosis of that disease in the United States. It was apparently introduced in breeding stock from Canada.

Scrapie has been known for many years in some foreign countries, especially England and Scotland. It is a highly fatal virus disease affecting the central nervous system. The affected sheep rub against objects and bite themselves. The wool becomes dry and falls off in tufts due to the rubbing. One important characteristic of this disease is the long incubation period, from one to three years, which permits the possibility of spread before symptoms are observed. Also, the disease is unusual in that it is transmitted from either parent to the offspring.

Inasmuch as scrapie is a foreign disease, emergency measures are taken to prevent the disease from becoming established in this State. The slaughter method of eradication with payment of indemnities was used. The flock found infected during May, 1955, consisted of 184 commercial sheep. Only one purebred ram, which originated in Oregon and was sold directly to the owner of this flock, actually showed symptoms of scrapie. The entire flock of 184 sheep was appraised and slaughtered June 30, 1955. Equal indemnity payments of $1,930.62 by the State and Federal Governments were made to the owner.

Scrapie has appeared during recent years in 14 other states, involving 42 flocks. In each instance affected and exposed sheep have been slaughtered.

Because of the extremely long incubation period, the problem of eradicating scrapie becomes rather difficult. It requires repeated inspections of all contact sheep and the progeny of known infected parents. All known importations, from flocks in other states or other counties which have developed scrapie, must be inspected repeatedly for a period of at least three years.

Anthrax

Only 10 outbreaks of anthrax were reported during 1955; four in dairy cattle, four in beef cattle and two in sheep. Each outbreak occurred on premises where anthrax has previously been reported. The diagnosis in each case was confirmed at a state pathology laboratory. Fresno County had three outbreaks. Marin, Merced and San Benito Counties each had two outbreaks, and one occurred in Kern County.

Hold orders are placed on each herd where the disease is diagnosed, to control movements from the premises until the disease is under control. Control is by vaccination and proper disposal of all carcasses of livestock which have died of the disease.

Equine Encephalomyelitis

The incidence of equine encephalomyelitis decreased during the year; there were only 29 reported cases, and of these eight horses died. The cases were distributed as follows:

Merced County, 5; San Joaquin, 3; Siskiyou, 3; San Luis Obispo, 3; Tehama, 2; Stanislaus, 2; Imperial, 2; San Bernardino, 2; Fresno, 2; San Mateo, 1; Shasta, 1; Sacramento, 1; Santa Barbara, 1; Tuolumne, 1.

There were 2,231 reported vaccinations against the disease. Vaccination is conducted during the spring as a preventive measure.

Chorioptic Scab

CATTLE

On November 1, an entry of 14 purebred beef-type shorthorn cattle at the Grand National Livestock Exposition, held in the San Francisco Cow Palace, was found to be affected with chorioptic scab. The animals were returned to their home ranch, Merced County, where a total of 39 infested and exposed animals were treated with benzene hexachloride (BHC) solution twice, 10 days apart. These animals had been shown at various fairs and thus started a chain of investigations to determine if other cattle were infested. As a result, a herd of purebred Shorthorn cattle in San Joaquin County was found to be infested; 38 cattle were treated in that herd to control the outbreak. A third herd in Kern County, consisting of 52 purebred Hereford cattle, was found to be infested. These were also sprayed twice in BHC solution. The mites causing

the disease were identified at the Sacramento Pathology Laboratory as *Chorioptes bovis*.

SHEEP

Three outbreaks of chorioptic scab in sheep were reported, one near Livermore, Alameda County, in a flock of 425 sheep; the second in a group of rams in San Luis Obispo County; and the third in a small flock in Lake County. In each case *Chorioptes bovis* mites were found, and the affected and exposed sheep were dipped in BHC solution.

Johne's Disease

Seven cases of Johne's Disease were diagnosed in Sonoma County, and one case each in Stanislaus, Humboldt, Mendocino and San Mateo counties. Each diagnosis was confirmed at a state pathology laboratory by finding the *Myçobacterium paratuberculosis* in the intestinal mucosa or mesenteric lymph gland. Two of the above cases were in sheep and the balance in cattle. To control the disease, the entire herd should be tested, and affected animals isolated from the herd. Sanitary precautions must be exercised. On ranches where the disease had become well established, eradication was difficult.

Acute Upper Respiratory Disease (Rhinotracheitis)

The acute upper respiratory disease outbreaks which began during the fall of 1953 continued throughout 1955. The infection was first observed in dairy cattle, but during the fall of 1954 beef herds became involved. A similar condition reported in Colorado and other Western states was known there by the names "red nose" or rhinotracheitis. It had been observed most frequently in feeder cattle in large concentrations, usually three to eight weeks after going on feed. The affected animals usually recovered after seven to 10 days, but there was an associated weight loss of approximately 200 pounds per animal for feeder cattle and marked drop in milk production of dairy cattle. In view of the growing seriousness of the disease, the United States Agricultural Research Service called a meeting of research workers in February, 1955, to discuss the problem; up to that time no one had been able to transmit or identify the cause of the condition.

After research with material from affected animals, workers at the School of Veterinary Medicine, University of California, Davis, determined that the disease called "red nose" or rhinotracheitis in Colorado was the same disease found in California and called acute upper respiratory disease. Later the research workers were able to isolate a virus which caused the disease.

Though the condition appears somewhat milder in dairy cattle, it is now considered to be the same disease which occurs in beef cattle.

Acute lesions of the upper respiratory tract characterize the infection. No specific treatment has been developed. Studies are being carried out by the Federal Government at a foreign laboratory to eliminate any possibility that the disease may be a form of rinderpest. Challenge tests have thus far shown that this condition, as well as mucosal disease and virus diarrhea occurring in some Eastern states, is not rinderpest. Outbreaks of acute upper respiratory disease during 1955 are shown in the accompanying table.

DAIRY CATTLE

County	Herds	Cattle involved	Cattle affected	Number deaths
Fresno	3	450	24	2
Kings	1	100	7	2
Los Angeles	3	870	18	1
Madera	1	25	3	0
Orange	6	1,469	55	2
San Bernardino	1	155	6	1
Tulare	1	150	2	0
Total	16	3,219	115	8

BEEF CATTLE

County	Herds	Cattle involved	Cattle affected	Number deaths
Fresno	1	8,500	300	200
Kern	2	8,350	42	14
Kings	1	15,000	500	50
Madera	1	190	0	2
Napa	1	1,800	100	25
Riverside	3	19,542	370	53
San Joaquin	1	1,200	16	0
Santa Clara	1	4,000	25	5
Total	11	58,582	1,353	349
Grand total	27	63,801	1,468	357

Newcastle Disease of Poultry

During October and November, outbreaks of Newcastle disease were reported in 24 flocks of chickens being raised for meat in the area of Los Angeles County. Mortalities were unusually high, reaching 22 percent in

the worst affected flocks. The fact that all of these flocks had been previously vaccinated suggested that we might be dealing with a variant type of the disease against which the commercial vaccines were ineffective.

Investigations disclosed, however, that a live-virus vaccine produced by one commercial laboratory had been used in every instance. Also, other flocks in the same area, which had been vaccinated by a different procedure using other serial lots of the same type and brand of vaccine, were evidently immune to the disease. It would appear, therefore, either the vaccine used prior to the outbreaks or the method of application recommended by the manufacturer was in some way deficient. In general, vaccination against Newcastle disease has been quite successful.

Artificial Insemination of Animals

Artificial insemination services were reported in 45 counties of the State. Approximately 30 percent of California's adult female dairy cattle population is now being inseminated artificially. County reports range from 10 percent in the northern counties to 70 percent in Kern and Ventura Counties. Insemination by groups is shown in the accompanying table.

There was an increase of 3 percent over 1954 when 253,439 first inseminations were reported.

Group	Number of organizations	Number of operators	Number of first services inseminations
Organized artificial breeding associations	7	184	249,341
Independent artificial breeding groups (dairy)	32	34	11,498
Independent artificial breeding groups (beef)	2	2	483
Total	41	220	261,322

TUBERCULOSIS AND BRUCELLOSIS CONTROL PROGRAMS

By E. F. CHASTAIN, D.V.M.

Tuberculosis Eradication

Bovine tuberculosis testing continued under the cooperative efforts of the Bureau of Livestock Disease Control and the United States Department of Agriculture, Animal Disease Eradication Branch. A total of 665,528 cattle were tested in 17,412 herds. One thousand six hundred and forty-three animals reacted to the tests and were removed from the herds; the percentage of infected cattle was 0.246.

As a result of the testing program, 14 counties were declared modified accredited tuberculosis-free areas for another three-year period. They were Alameda, Contra Costa, Del Norte, Fresno, Humboldt, Imperial, Inyo, Mono, Napa, San Diego, San Joaquin, Santa Cruz, Shasta and Stanislaus.

County livestock inspectors reported 47,359 additional bovine tuberculin tests on imported cattle, with 120 cattle reacting. Practicing veterinarians reported private tests of 5,846 cattle with no reactors.

Reports were received of 1,572 tuberculin tests conducted on goats; no reactors were found.

BRUCELLOSIS CONTROL

Calfhood Vaccination

Calfhood vaccination against brucellosis remained the principal factor in control of this disease in California. During the year, a total of 350,165 calves were vaccinated officially. Since the vaccination law became effective January 2, 1948, more than 2,500,000 calves have been vaccinated providing a large population of resistant disease-free cattle.

It is now estimated that close to 100 percent of all dairy heifers in the State are being included in the program. Records show that although the total number of calves of all breeds vaccinated during 1955 was less than the previous year, the number of dairy calves vaccinated was greater. Some credit for this excellent coverage goes to the Federal Government for their additional incentive payment to contract veterinarians for vaccinating the small lots of calves (five or less). Another factor which stimulated the vaccination of dairy calves was the impending effective date (January 2, 1956) of Dairy Cattle Brucellosis Regu-

TABLE 1

Brucellosis Calf Vaccination

Summary 1955 (Calendar Year)

County	Dairy female	Dairy male	Beef	Total	Number dairy ranches	Number beef ranches	Total
Alameda	1,522	28	1,032	2,582	158	51	209
Alpine			1,412	1,412		19	19
Amador	130		157	287	17	15	32
Butte	2,873	61	1,804	4,738	455	120	575
Calaveras	99	1	891	991	20	31	51
Colusa	683	9	1,060	1,752	102	30	132
Contra Costa	1,012	11	2,391	3,414	68	90	158
Del Norte	871	15	92	978	114	5	119
El Dorado	71		920	991	24	49	73
Fresno	17,676	148	3,666	21,492	1,697	164	1,861
Glenn	5,843	72	1,186	7,101	669	47	716
Humboldt	5,914	122	811	6,847	767	49	816
Imperial	2,755	72	299	3,126	164	15	179
Inyo	199	1	1,331	1,531	10	18	28
Kern	3,359	19	6,792	10,170	251	110	361
Kings	11,076	95	287	11,458	917	14	931
Lake	316	1	716	1,033	61	24	85
Lassen	214	2	5,680	5,896	42	125	167
Los Angeles	9,097	74	811	9,982	612	51	663
Madera	7,234	57	1,498	8,789	569	52	621
Marin	6,858	19	424	7,301	353	17	370
Mariposa	154	2	427	583	17	12	29
Mendocino	1,132	9	1,501	2,642	180	55	235
Merced	24,820	206	4,665	29,691	2,304	102	2,406
Modoc	144		13,014	13,158	34	226	260
Mono	2		2,067	2,069	1	24	25
Monterey	3,788	24	4,348	8,160	324	92	416
Napa	1,476	12	659	2,147	164	50	214
Nevada	248	15	695	958	56	53	109
Orange	3,576	31	1,012	4,619	210	14	224
Placer	1,144	21	987	2,152	203	55	258
Plumas	37		1,407	1,444	8	48	56
Riverside	4,271	28	532	4,831	378	40	418
Sacramento	6,539	76	2,594	9,209	1,023	164	1,187
San Benito	520	5	3,061	3,586	78	52	130
San Bernardino	5,710	25	431	6,166	400	39	439
San Diego	5,079	19	1,918	7,016	330	72	402
San Francisco							
San Joaquin	17,447	177	3,389	21,013	2,049	158	2,207
San Luis Obispo	2,828	13	2,546	5,387	235	73	308
San Mateo	1,892	29	229	2,140	95	13	108
Santa Barbara	2,815	24	6,197	9,036	165	135	300
Santa Clara	4,569	54	1,585	6,208	388	74	462
Santa Cruz	681	9	488	1,178	143	57	200
Shasta	779	11	2,835	3,625	138	124	262
Sierra	17	1	333	351	2	12	14
Siskiyou	819	1	4,833	5,653	121	161	282
Solano	1,224	40	1,741	3,005	170	52	222
Sonoma	12,242	158	1,206	13,606	1,463	122	1,585
Stanislaus	29,283	333	1,885	31,501	3,435	66	3,501
Sutter	1,427	15	542	1,984	198	43	241
Tehama	2,471	26	2,381	4,878	374	101	475
Trinity	42		459	501	12	10	22
Tulare	19,304	133	2,573	22,010	1,350	123	1,473
Tuolumne	58		665	723	12	17	29
Ventura	1,801	64	1,272	3,137	67	45	112
Yolo	1,130	3	871	2,004	145	60	205
Yuba	1,086	2	835	1,923	121	36	157
Totals	238,349	2,373	109,443	350,165	23,463	3,676	27,139

lation 754.1 in its final form. This regulation placed great emphasis on the ear tattoo, signifying official vaccination where the movement of dairy cattle is concerned.

New Regulations

In February, 1953, two regulations (1) restricting the sale or disposition of dairy cattle (intrastate) and (2) the movement of dairy cattle (interstate) were adopted to become effective January 2, 1956. During 1955 the first of these regulations pertaining to intrastate movement was amended twice. Public hearings were held in Los Angeles on July 21st, and in Sacramento on July 26th, after which the regulation was amended to apply only to public and private

sales, other forms of legal disposition having been deleted.

Later another series of public hearings were held in Los Angeles on December 6th, Sacramento on December 14th, and Fresno on December 22d. As a result of these hearings, Dairy Cattle Brucellosis Regulation 754.1 was amended to its final form, which stated in effect that before being moved dairy cattle over six months of age must either have been officially vaccinated against brucellosis or have passed a negative blood test for brucellosis. The effective date remained January 2, 1956.

The companion regulation 754.2, concerned with the interstate movement of dairy cattle, remained unchanged.

Brucellosis Tests

Brucellosis tests of cattle reported during the year, under Section 754 of the Bovine Brucellosis Regulations, were as follows:

Lots tested	2,815
Cattle tested	27,872
Total number of reactors	885
Reactors subject to branding	558

Adult Vaccination

Under Section 754.3 of the Bovine Brucellosis Regulations, 1,464 adult cattle in 340 lots were officially vaccinated against brucellosis after passing a negative test for the disease. Seventy-one of the cattle were reported to have originated outside the State.

Milk Ring Test Survey

In cooperation with the United States Department of Agriculture, Animal Disease Eradication Branch, and using the facilities of their mobile laboratory, a brucellosis milk ring test survey was made of 15,081 dairy herds in the State. Milk samples were collected at processing plants or on farms and tested in the trailer laboratory, which moved from one area to another as each survey was completed.

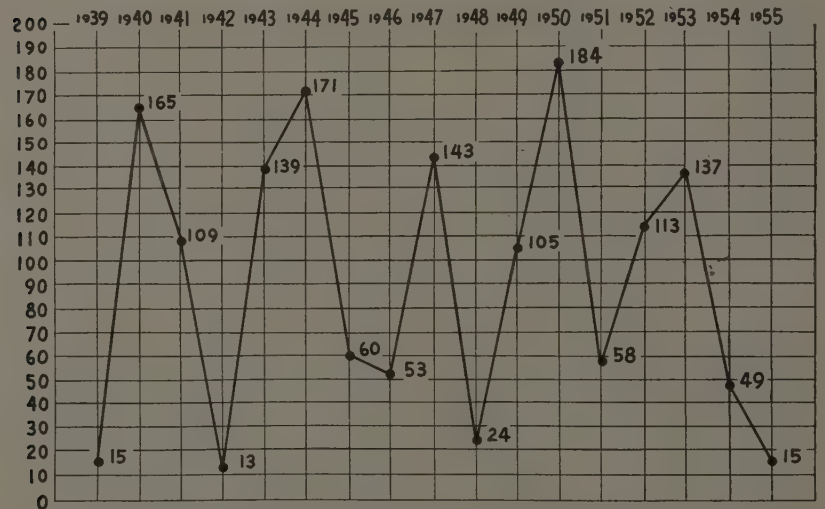
This survey showed that 55.9 percent of tested milking herds showed no evidence of brucellosis infection. The high percentage of disease-free herds is an indication of the splendid results of eight years of calfhood vaccination against the disease.

Swine Brucellosis Control

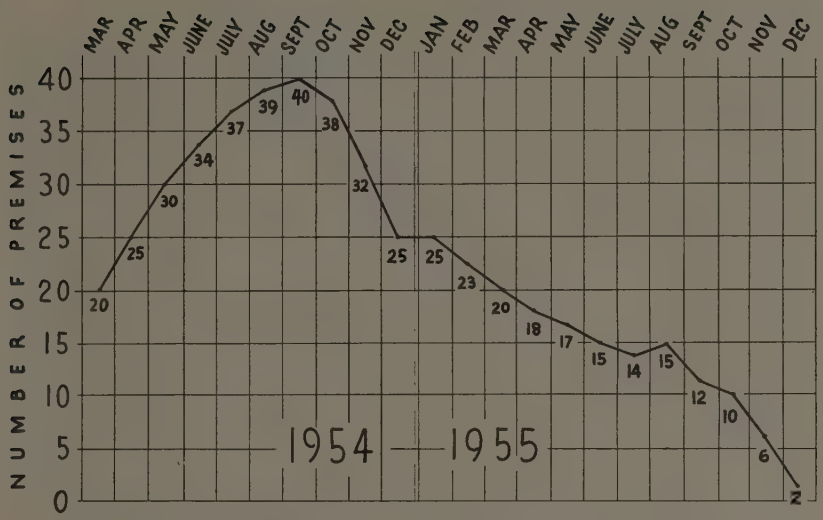
Testing of swine for brucellosis continued on a voluntary basis. Reports of swine tested were received as follows:

Lots tested	240
Swine tested	1,373
Reactors	54

A review of the voluntary program aimed at certifying herds as brucellosis-free revealed that at the end of the year 25 herd owners were participating, 16 of which held brucellosis-free herd certificates.



Number of outbreaks of vesicular exanthema in California, 1939 through 1955



Vesicular exanthema exposed premises progress chart, March 19, 1954, through December 31, 1955

VESICULAR EXANTHEMA CONTROL PROGRAM

By L. D. MEYERS, D.V.M.

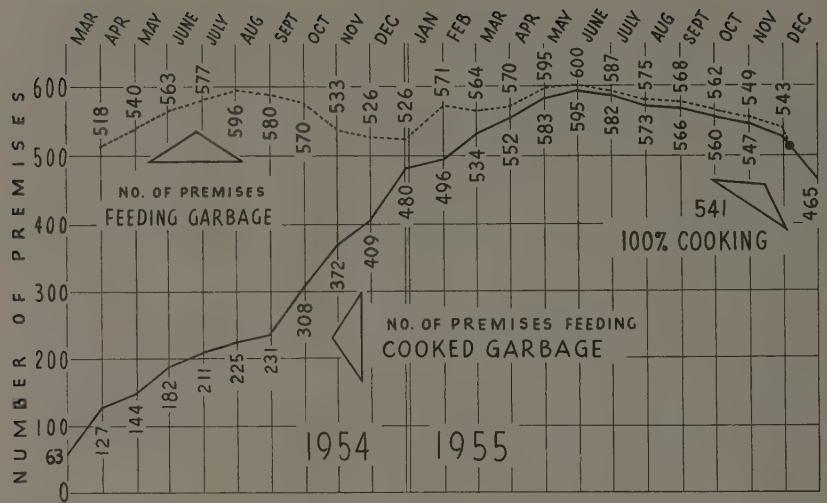
Definite progress to control vesicular exanthema was achieved throughout the State during the past year, under the provisions of Article 6, Vesicular Exanthema Quarantine Regulations. On April 1, 1955, an amendment was adopted to Section 791 of the above regulation which reduced the holding period on exposed swine from 60 to 30 days, provided that no new swine have been added to the premises since the last infection was observed. Major gains in this program for 1955 are shown in the accompanying progress report.

April 1, 1955, the Legislature passed Senate Bill Number 1176, which was signed by the Governor on May 23, 1955, to become effective January 1, 1956. This act requires heat treatment of garbage fed to swine. The law also provides for licensing all premises on which garbage is fed to swine, and requires that such places follow sanitary and garbage cooking operations in accordance with prescribed regulations. During June, 1955, a suggested operational and sanitary guide for garbage feeding operators and a copy of the new cooking law was distributed to all listed operators. Field personnel contacted operators in order to acquaint them with the expected requirements of the new law and to prepare the groundwork for proposed regulations.

Progress Report, 1955

	Status Dec. 31, 1954	Dec. 31, 1955
Premises cooking garbage	480	465
Premises feeding raw garbage	43	0
Premises under federal-state quarantine	75	7
Vesicular exanthema outbreaks for each year	49	15
Premises involved with vesicular exanthema each year	39	13
Number of vesicular exanthema exposed premises	25	2
Number of vesicular exanthema exposed swine (approximately)	21,000	8,000

Several informal group meetings were held with garbage feeders and regulatory officials during the summer months. On August 30, 1955, the state-wide Vesicular



Vesicular exanthema control program progress chart, March 19, 1954, through December 31, 1955

Exanthema Advisory Committee, which met with regulatory officials in Sacramento, endorsed the proposed regulations with only minor changes. Public hearings were held in Los Angeles, October 3d, and in Sacramento, October 4th, on the proposed regulations under Article 7, "Swine Diseases from Garbage." On October 14, 1955, the new regulation was signed by the director and filed in the office of the Secretary of State, to become effective January 1, 1956.

The incidence of vesicular exanthema steadily declined during the year; in addition, all but two garbage feeders were cooking by July.

Another factor which aided in this control program was the purchase by the United States Department of Agriculture of soda ash and the transfer of three cleaning and disinfecting rigs to California, along with personnel experienced in this type of work. Before vesicular exanthema-exposed premises were released from federal-state quarantines, they were thoroughly cleaned and then disinfected with this spray equipment. In many instances cleaning and disinfection was carried out repeatedly on old premises where the disease had been endemic for several years. The operators welcomed this gesture by the government and as a result most of them responded to the extent of making long overdue repairs and improvements.

However, by October two premises remained on which vesicular exanthema continued to flare up in a mild form and in early November another premise that had a previous outbreak in March, broke again.

VESICULAR EXANTHEMA OUTBREAKS, 1955

County	*Number of premises*
Alameda	4
Los Angeles	1 *
Orange	1
San Francisco	1
San Mateo	4
Santa Clara	1 *
Sonoma	1
Total	13

Month	*Number of outbreaks*
January	4
February	3
March	2
April	1
May	0
June	2
July	0
August	2
September	0
October	0
November	1
December	0
Total	15

* Had two outbreaks during the year.

The state and federal regulatory officials were seriously considering a liquidation and indemnity program on the remaining infected premises as a final measure to eradicate vesicular exanthema in California. On November 15, 1955, in response to a proposal made by the California Department of Agriculture, the United States Department of Agriculture agreed to assist California in this all-out effort. The Federal Government agreed to pay half of the value, less salvage, of the animals that would be marketed, with the understanding that the State would provide funds for its share of the indemnity. A similar program was conducted in other states where this disease was found in 1952 and 1953. On December 29th, liquidation was completed on one infected premise near Buena Park, Orange County. A total of 1,793 hogs were destroyed. The premises were abandoned for swine raising. Liquidation of the swine on two remaining vesicular exanthema-exposed premises should be completed during January and February, 1956.

The Animal Disease Eradication Branch, United States Department of Agriculture, which cooperates with the California State Department of Agriculture in the vesicular exanthema control program has released the following report of vesicular exanthema control on the national level for 1955. States having quarantined areas were California, Connecticut and Massachusetts.

During the past year, research work was conducted by veterinarians of the School of Veterinary Medicine, University of California at Davis, in cooperation with federal and state regulatory veterinarians. Results of this work indicated that vesicular exanthema infection may be present in a herd in such a mild form that it can be missed by experienced inspectors. It now appears that on premises which have endemic outbreaks of vesicular exanthema, a high rate of subclinical infection may occur. This is apparently a property of certain strains of virus.

LIVESTOCK AND POULTRY PATHOLOGY LABORATORIES

By W. W. WORCESTER, D.V.M., *Supervisor of Laboratories*

The general trend in most of the laboratories in the bureau is a leveling off of poultry cases. This does not mean, however, that the volume of work required has leveled off. New diseases such as hepatitis, chronic respiratory disease, ornithosis, new vaccines and new methods of using vaccines, have complicated the diagnostic procedures to the point where more equipment is needed and a great deal more time is consumed to reach a final diagnosis. Mixed infections mainly viral and bacterial combinations are extremely difficult to diagnose accurately and be able to inform the grower as to which agent is the source of the trouble. As an example of this type of poultry diagnostic work, the San Gabriel laboratory used approximately 1,000 chick embryos and over 500 chicks for routine diagnostic procedures in addition to large volumes of all kinds of medias and diagnostic tests.

All of the laboratories have made studies of the use of the plate agglutination test for chronic respiratory disease and found it to be helpful in many cases. This disease seems to be one of the biggest problems in the State.

The general trend for large animal cases continues to increase. The enactment of the state Brucellosis Regulations, Sections 754.1 and 754.2 resulted in a considerable increase in requests for brucellosis tests during December.

The use of various methods of diagnosing leptospirosis has increased the volume of work and brought out a significant fact that leptospirosis is widespread in California.

Summary of Laboratory Accessions and Poultry Blood Tests—1955

	Poultry blood tests pullorum	Poultry blood tests *Salmonella typhimurium*	Poultry accessions	Large animal accessions
Sacramento	213,791	182,776	1,672	1,236
Petaluma			3,357	850
Fresno	382,008	142,174	1,833	1,711
San Gabriel	137,636	48,953	3,662	836
Turlock			4,241	
Lancaster			*611	

* April through December.

SAN GABRIEL

The San Gabriel Livestock and Poultry Pathology Laboratory had a unique experience in diagnosing a virulent form of Newcastle disease in pheasants from India and another case in doves, both cases being held under federal importation quarantine. These experiences have prompted more strict quarantine and embargo regulations to protect the poultry industry of the State and Country.

The San Gabriel large animal cases have shown a steady increase since 1950. Of interest were two cases of *Clostridium septicum* infection in swine. Both cases were described as chronic conditions with only occasional sudden deaths. Pathology involved mainly the liver. Biochemical and animal inoculations gave typical reactions for *Clostridium septicum* and vaccination of the herds with *Cl. septicum* bacterin appeared to be effective in controlling the disease.

Two unusual infections of mammals with *Salmonella pullorum* were detected during the year. One case was a herd of swine having an abortion problem. Bacteriological studies of an aborted fetus resulted in the isolation of the standard type of *S. pullorum*. Investigation revealed the swine had been fed offal from poultry dressing plants and hatcheries.

The other isolation of *S. pullorum* was from the liver of a calf. In this case it was found that raw eggs were being fed by the herdsman as a supportive treatment for diarrhea.

FRESNO

Avian infectious hepatitis-synovitis was a major problem in flocks in the Fresno area. A report was made of the isolation of pleuropneumonia-like organisms (PPLO) from the sinus of a goose that reproduced sinusitis in test poults. This laboratory reports a significant decrease in the incidence of coccidiosis in chickens during the year. Newer and better coccidiostats may account for this decrease.

At the Fresno laboratory an increase in large animal cases of 30 percent was noted.

The adoption of the agglutination plate method of testing for leptospirosis accounts for some of the dramatic increase of cases and specimens. Compared to the previous year there was a 60 percent increase in the isolations of *Salmonella dublin* in cattle. Apparently this type of paratyphoid is becoming well established in the San Joaquin Valley.

Some observations were made on treatment of parakeratosis in swine with zinc supplement which resulted in complete recovery of this type of dermatitis within 30 days.

SACRAMENTO

Bids for the new laboratory at Sacramento were opened on July 12, 1955. The contract for the building in the amount of $231,700 was let on August 10, 1955, and construction began shortly after that date. The building is scheduled to be completed on or about May 10, 1956.

The Sacramento Livestock and Poultry Pathology Laboratory reports that the number of cases of chronic respiratory disease of poultry has doubled from the previous year. There was a notable increase of rickets in mature chickens. All of these ricket cases were from wire cage operations and lack of exposure to direct sunlight was a common factor. A 49 percent drop in the cases of coccidiosis is reported and new coccidiostats are probably the major cause for this decline. The principal disease entities diagnosed in large animal cases at this laboratory were clostridial infections, brucellosis, leptospirosis and salmonellosis. One case of scrapie in sheep was diagnosed during the year.

An interesting case of fluorosis was diagnosed. Nine of 40 head of cattle located in Contra Costa County developed laminitis in a period of three weeks. A sporadic diarrhea was present and animals became progressively poor. The pasture involved, bordered the Carquinez Straits. This was the first year the pasture had not been flooded and the grasses were coated with a crystalline material. A level of 3,400 parts per million of fluorine was found on chemical anlysis of the plants—25-50 ppm may be toxic if the source is from industrial residue. There are a few industrial plants in the area as a possible source of the fluorine. Chemical analysis of bone from two animals demonstrated 6,500 ppm and 5,200 ppm of fluorine, whereas normal bone may contain only 600 ppm.

PETALUMA

The Petaluma Livestock and Poultry Pathology Laboratory reported about the

same decrease in the cases of coccidiosis due to newer types of coccidiostats as was reported by the other laboratories. A substantial increase in the number of cases of blackhead in chickens was noted. Fowl pox increased due to negligence in vaccination, and hemorrhagic disease more than doubled in diagnosed cases. An increase in the number of cases of anthrax of large animals was noted. All outbreaks were confined to ranches that had previous histories of this disease.

Clostridial infections caused by septicum, welchii and novyii are believed to cause many of the sudden unexplained deaths observed in sheep on the coast ranges.

TURLOCK

At the Turlock Poultry Pathology Laboratory a change in the disease picture has been noted and is due to two main factors. These are the development of improved methods of diagnosing chronic respiratory disease and identification of a hitherto unrecognized disease of chickens and turkeys named avian infectious hepatitis-synovitis.

Avian infectious hepatitis-synovitis first became apparent as a fulminating outbreak of a disease, characterized by severe liver damage, in eight separate flocks of laying birds in the Turlock area. The first outbreaks occurred in October of 1954. Since attempts at a diagnosis by ordinary means were unproductive, and the disease was apparently a new condition, considerable extra effort was made at this laboratory to establish a diagnosis and work out an effective method of treatment. Dr. G. N. Lukas, who was then on the staff of the Turlock laboratory, worked out the etiology and therapeutics within a period of four months. This work was published in the 1955 May issue of the Journal of the American Veterinary Medical Association.

LANCASTER

The Lancaster Poultry Pathology Laboratory located in the Antelope Valley in Southern California is the newest laboratory established in the Bureau of Livestock Disease Control. The opening of this laboratory took place on April 4, 1955. The facilities consist of a building of 900 square feet including an office and reception room, two poultry autopsy cubicles, a bacteriological laboratory and pathologist office area.

The poultry disease picture of Antelope Valley, conditioned by a dry desert climate with some rather extreme winter weather, has consisted primarily of the respiratory diseases. Coccidiosis in this area, while not entirely absent, is minor as compared to the more humid sections of the State. Other common bacterial infections such as paratyphoid, pullorum and fowl cholera, are prevalent to some extent. Infectious avian hepatitis-synovitis seems to be increasing even since the opening of the laboratory.

Bureau of Livestock Identification

LOGAN MORTON, *Chief*
PAUL G. ROBERTSON, *Assistant Chief*

As a means of protecting the California cattle industry from livestock loss due to straying or theft, 108 hide and brand inspectors, located in cattle producing and marketing areas, inspected 5,149,222 animals during the calendar year 1955.

Although a majority of these animals were inspected at various livestock auction yards, posted stockyards and slaughterhouses, a large percentage was inspected in small lots at private ranches, prior to transporting to the marketing areas, purebred sales and private dispersal sales. This was particularly true in point-of-origin areas, where inspection is required before animals are loaded into trucks for transporting out of the county, regardless of the purpose of the transportation. In counties other than point-of-origin, when cattle are shipped by the owner to a salesyard or slaughterhouse where inspection is regularly maintained by the bureau, inspection is mandatory at the destination. Inspections performed by bureau personnel included horses for slaughter and bovine animals transported, sold or slaughtered.

During the year, the bureau recorded for use in California 2,368 cattle brands, 42 horse brands, one mule brand and five sheep brands; there was a total of 2,416 new recordings. These additional recordings brought the total number of current brands now registered for use in California to approximately 28,000. There are approximately 2,000 brand owners who either cancel or forfeit their brands each year.

Brands on which renewal fees are not paid are suspended for a year. If not reinstated within the year of suspension, they become forfeited at the end of the year. The use of a brand on which the renewal fee has not been paid is illegal. There were 474 brands transferred to new owners.

Brand Book Issued

Although the first brand book published in 10 years, current to June, 1954, was not ready for distribution until February, 1955, the department published a supplement, including brand transfers, registrations and reinstatements, to June, 1955, and distributed it August 25, 1955. The book contains a complete alphabetical list of brand holders with their addresses, brand designs and registration numbers. In addition, there is an alphabetical listing of all brand designs. Copies of this brand book and the supplement were provided each county sheriff's office, county agricultural commissioner and county farm advisor, where they may be used as a quick reference to locate owners of strayed or stolen animals. This brand book is also available to the general public at the Documents Section, Division of Printing, Sacramento, at a cost of $7.73 for the book and $1.55 for the supplement.

On January 1, 1959, brands will be placed on a state-wide basis; all similar brands will be forfeited except the one bearing the lowest registration number. The brand book may be used by brand holders to ascertain the status of their design, by referring to the design listing. If there are similar designs for use on the same location, the lowest registration number will retain statewide status. All others should be adjusted prior to January 1, 1959.

Lost, Strayed or Stolen Animals

During the year, there were 1,024 animals reported to the bureau as missing, either lost, strayed or stolen. A full description of each animal and the location where they were last seen was published in the bureau's weekly Estray Bulletin, a copy of which is sent to all brand inspectors and sheriffs' offices. This bulletin affords the law enforcement agencies an opportunity to be on the lookout for these animals within a short time after they are reported missing. During the same period, there were 500 animals turned over to or seized by bureau personnel, when animals were found in the possession of persons unable to prove ownership by bills of sale or other documents.

A search of brand records was made by office personnel to determine ownership, if possible; 144 of these animals, valued at $10,-

353.50, were returned to their legal owners. The balance of these estray animals was advertised in local newspapers or trade journals and sold at public sale to the highest bidders; these sales brought a total net return of $5,203.34, now being held in a special fund available for claim during a one-year period upon proper proof of ownership. Through the efforts of brand inspectors and deputy sheriffs, 1,170 strays valued at $90,626.72 were returned to their legal owners. These animals are usually reported as straying on the highway or getting into some cattleman's pasture. Sometimes the owners are known at time of reporting, but usually it requires considerable work to locate the owners.

Law Enforcement

Six supervising hide and brand inspectors, working with other law enforcement agencies, have been responsible for the filing of 16 misdemeanor cases against persons for transporting cattle without inspection; two for selling cattle or purchasing cattle without issuing or receiving bills of sale. There were convictions in eight of the above-mentioned cases; 17 felony cases were filed for grand theft. Ten convictions resulted, and two defendants were sent to state prison for from 1 to 10 years, and one for from 1 to 15 years. The other cases were reduced to misdemeanors and defendants either fined or sent to county jail.

In addition to court cases mentioned, our field staff issued 59 warnings for transporting cattle without having the shipments accompanied by proper consignment papers; 86 for transporting cattle without inspection prior to transporting; nine for slaughtering cattle without inspection; two for sale or receipt of cattle without a bill of sale; nine for slaughtering cattle without a license; 22 for improper branding; five for conducting cattle sales without a proper license; one for transporting horses without a horse transportation license and four for substituting cattle in a shipment which had been inspected.

Border Inspection

During April, at Blythe, California, 14 border station inspectors of the Bureau of Plant Quarantine, were qualified by the department to act as brand inspectors. These men work on an hourly basis when off duty from the quarantine station. Since no brand inspector was located within 30 miles of the border station, it was necessary to have inspection service established and someone to patrol the back roads leading into Arizona. We hope to establish the same service at other border stations in the future.

Bureau Reorganization

One important development in the bureau during 1955 was the drafting of a reorganization plan, approved and made effective early in 1956. The plan divides the State into three major areas, and the present six large districts are divided further into 11 smaller districts.

Each district has a working supervisor, responsible to an area supervisor who in turn is responsible to Sacramento headquarters.

Licensing

One hundred sixty-two cattle slaughterer's licenses were issued to plant owners, 36 to lessees.

Twelve horse slaughterer's licenses were issued to plant owners and one to a lessee.

Eighty-eight licenses were issued to public cattle salesyard operators.

Thirteen licenses were issued for transportation of horses.

All salesyards and slaughterers must have a bond filed before the license can be issued. The bond provides that no animal shall be sold or slaughtered except by the owner or with his authorization.

New Legislation

Several amendments to the hide and brand laws were passed by the 1955 Legislature. Until 1955, a recovery for slaughtering cattle without being the owner or authorized by the owner, was twice the value of such animals, one-half to the owner and one-half to the department. Under the amendment, only the value of the animal may be recovered, and the entire amount is paid to the owner.

Two Agricultural Code sections were added providing that any person found driving cattle off their usual range without the consent of the owner is guilty of a misdemeanor. These sections were already in the general law, but are now included in the Agricultural Code.

Vent brands may now be applied on either loin of an animal.

Cattle record brands may now be applied to the right loin of an animal in addition to positions heretofore provided.

The inspection fee on cattle, other than suckling calves accompanying their mothers, when the cattle are transported for purposes other than sale or slaughter and no change of ownership is involved, has been reduced to 10 cents per head.

In order to provide a means of emergency sales of cattle requiring immediate disposal or to salvage something out of animals valued at less than $40, Section 396 of the Agricultural Code was amended to permit the sale of such animals any time after five days following seizure.

Since the code requires all persons finding stray animals to report them to the department within five days, the law was amended to limit the allowance to taker-up for feed and care not to exceed five days prior to the date the animal is reported to the director.

Heretofore, cattle killed on a railroad right of way had to be reported to the department within 45 days. The law has been amended to require such killing to be reported by the railroad as soon as possible, but in no event later than 96 hours after the collision; and the report to be by telephone, telegraph or mail to owner if known. When the owner is not known, then reports should be made to the sheriff, constable or brand inspector nearest the place of collision. The amendment further provides that it is illegal for any person to bury, conceal or destroy any animal or do anything to the carcass which will tend to make ascertainment of ownership more difficult, until the owner has been notified or a brand inspector has identified brands and marks.

The 1955 Legislature passed a regulatory law prohibiting the capture of wild burros without securing a permit for such capture. While the enforcement of this provision was delegated to the Department of Fish and Game, issuance of permits has been handled by this bureau. Permits contain a complete description of the applicant and are issued upon the condition that the burro remain the property of the State of California for a period of three years. Providing further, the burro shall only be used as a pet or a beast of burden. Anytime within the three-year period, the burro can be released within 10 miles of its place of capture. There were two permits issued during the year.

Bureau Activities

Since a considerable number of brand applicants call at the office in person, it was felt that a separate brand office should be maintained. In February, a new brand room was opened off the fourth floor lobby just opposite the elevators in the new Department of Agriculture Building, 1220 N Street, Sacramento. It is convenient to the public and provides more privacy for discussing brand problems.

Local meetings of the California Cattlemen's Association were attended by bureau staff members in the Counties of Merced, Mariposa, Stanislaus, San Joaquin, Modoc, Shasta, Tehama and Plumas.

Staff members attended the annual statewide meeting of the California Cattlemen's Association at Red Bluff, in December.

The bureau chief attended the annual meeting of the National Cattlemen's Association in Reno, Nevada, and the executive meeting of the National Brand Conference, where amendments to the Packers and Stock Yards Act were discussed.

The bureau chief also attended the Beef Marketing and Transportation Meeting at Hollister, California; Peace Officers' meetings in San Joaquin, Kings and Tulare Counties; the annual State Convention of County Sheriffs at Sacramento; and the hide committee of the Western States Meat Packers Association in San Francisco, where proposed legislation was discussed to prohibit "hot" iron branding on any portion of the animal except the hips. Under present conditions, it is contended that a large area of the hide is lost for leather because of the brands.

At a meeting of the National Brand Conference, held in Portland, Oregon, uniform brand certificates, elimination of side brands and amendments to the Packers and Stock Yards Act were discussed. Logan Morton was elected vice president of the conference of this organization for the ensuing year.

Bureau of Meat Inspection

DR. G. A. BOYD, *Chief*

DR. R. W. McFARLAND, *Assistant Chief*

The inspection of animals in abattoirs and of meat products prepared in processing plants for human consumption in California is provided for in Sections 301-319 of the Agricultural Code. The inspection of foreign cold storage meat is provided for in Sections 321 to 325 of the Agricultural Code. Enforcement of these laws is vested in this bureau.

The purpose of these provisions of the code is to protect the public from unwholesome or otherwise objectionable meat products; to prohibit the sale of uninspected meat in counties of over 28,000 population; to maintain standards for sanitary construction and operation of meat slaughtering and packing establishments; and to prevent the mislabeling and adulteration of meat products.

The increased demand for meats in the State due to population growth has resulted in an ever-increasing number of plants devoted to meat packing. At the close of the year 343 establishments were operating under state inspection, 68 of which conducted slaughtering while 275 were engaged in meat processing operations only. This total represented an over-all gain of seven plants over 1954. During the last 10 years, the number of establishments operating under state inspection has increased by 45 percent. Supervision was also maintained by the bureau in 94 establishments operating under approved inspection conducted by four municipalities.

A total of 1,343,146 head of livestock was slaughtered under state meat inspection. This represented a slight decrease from the number of head slaughtered the previous year. This reduction in livestock slaughter was due entirely to a decrease in sheep slaughtered. The slaughter of cattle, calves and hogs increased slightly over the previous year.

Processing

Processing plants operating under state inspection manufactured 150,952,797 pounds of meat food products, an increase of 5,612,800 pounds over 1954.

The 94 establishments operating under approved municipal inspection manufactured 44,188,077 pounds of meat food products, a slight decrease under the previous year.

Labels

During 1955, 4,342 labels and sketches were reviewed—an increase of 795 over the previous year. Of this total number, 89 failed to meet the regulatory requirements and were not approved. Many label sketches were approved conditionally with the understanding that corrections be made on the finished label before final approval would be given.

Final form: 2,951 approved, 73 not approved	3,024
Sketch form: 1,302 approved, 16 not approved	1,318
	4,342

Foreign Cold Storage Meat

There was a substantial increase over the previous year in the amount of foreign cold storage meat imported into the State. These shipments consisted of beef, mutton, veal and pork from New Zealand; beef from Australia and cooked beef from Argentina. The number of licenses issued and license fees collected also showed an increase over the previous year.

A total of 955,240 pounds of foreign cold storage meat was imported into the State during the year. This is an increase of 779,794 pounds over the 1954 importation figure. This meat required 65½ hours for inspection; the driving of 241 miles incidental to such inspection; and the collection of $202.92 in inspection fees. There were no condemnations of these meats made.

Licenses issued for handling foreign cold storage meat and license fees collected were as follows:

Type license	*Number*	*Fee*	*Total*
Retail	51 @	$10	$510
Wholesale	4 @	25	100
Importer	9 @	25	225
Restaurant	1 @	5	5
Total license fees collected			$830

This aerial view shows a modern type functionally designed plant which, over a period of years, has become the standard for California meat plants

Condemnation Summary

There were 2,828,612 pounds of meat and products condemned as unfit for food under state inspection. This included 5,875 entire carcasses and 254,379 parts condemned on antemortem and postmortem inspection and 196,495 pounds of processed products. Under state approved municipal inspection 37,732 pounds of processed products were condemned.

A total of 645 cattle carcasses were retained for infestation with an intermediate stage of a human tapeworm, cysticercus bovis. This is an increase of 203 over the number of carcasses similarly infested last year. Of these carcasses, 642 were passed for food after removal of the parasite, 331 following freezing and three carcasses were condemned.

Abscesses and flukes continued to be the chief cause for the condemnation of cattle livers and during 1955 there were 44,451 abscessed livers and 70,267 livers infested with flukes condemned as unfit for human food.

Construction

During the period 47 plans for construction and reconstruction of establishment facilities were approved. This represents an increase of six over the number of plans reviewed and approved during the preceding year. These projects improved greatly the facilities for the wholesome production of meat.

Violations

There were 21 departmental hearings for minor violations and six convictions for more serious violations of the meat inspection provisions of the Agricultural Code: $1,050 were collected in fines, $100 in fines suspended, 90 days of prison sentences served and 660 days of prison sentences suspended by the courts.

Meat Inspection Laboratory

During the year 1955, 1,095 samples of various products and materials were examined in the meat inspection laboratory for adulteration, contamination, preservatives, artificial coloring and the use of excessive amounts of added water or fillers to sausage products. The tabulated results of these examinations follow:

	Passed	Not passed	* Not classified	Total
Meat and meat products	750	142	3	895
Edible oils and fats	4	—	—	4
Curing materials	83	12	1	96
Spices, cereals, condiments	45	14	—	59
Ink and ink ingredients	—	—	—	—
Miscellaneous	33	7	1	41
Totals	915	175	5	1,095

* Refers to samples received in condition not suitable for proper analysis.

In July, the laboratory was moved to new quarters at the Department of Agriculture Building, 1220 N Street; the tedious job of dismantling, packing, and setting up the equipment in our new quarters consumed several weeks, during which operations were drastically curtailed.

Shown above is a bureau inspector, on the left, observing the dressing of a beef carcass in a modern California slaughterhouse

Animals Slaughtered in California Under Federal, State and State-approved Municipal Meat Inspection—Period 1946-1955

Year	Cattle	Calves	Sheep	Swine	Total
State					
1946	286,987	245,356	280,970	146,294	959,607
1947	294,323	249,839	284,138	129,959	936,259
1948	265,653	197,830	304,475	179,538	947,496
1949	278,666	196,411	211,713	243,976	930,766
1950	283,460	164,669	165,387	233,213	846,729
1951	282,531	121,593	190,606	271,582	866,312
1952	316,337	169,434	266,800	298,577	1,051,148
1953	417,095	254,951	378,698	243,434	1,294,178
1954	434,447	288,606	399,623	224,548	1,347,224
1955	446,941	299,003	365,916	228,757	1,340,617
State approved					
1946	46,911	18,556	186,561	41,503	293,531
1947	31,577	13,070	139,270	22,960	206,877
1948	12,361	2,606	142,452	22,099	179,518
1949	14,038	2,397	122,196	24,285	162,916
1950	12,554	2,576	95,192	26,039	136,361
1951	11,418	707	37,632	12,830	62,587
Federal					
1946	1,451,784	385,554	2,780,942	1,440,055	6,058,335
1947	1,360,461	475,302	1,804,535	1,499,262	5,139,560
1948	1,170,308	417,016	1,716,519	1,528,140	4,831,983
1949	1,238,535	381,567	1,543,367	1,694,819	4,858,288
1950	1,186,321	296,053	1,475,705	1,802,025	4,760,104
1951	1,360,848	243,823	1,442,050	2,052,351	5,099,072
1952	1,498,846	251,992	1,602,158	2,058,669	5,411,965
1953	1,814,762	363,924	1,710,659	1,623,109	5,512,454
1954	1,858,715	390,274	1,774,860	1,613,446	5,637,325
1955	1,987,943	432,292	1,936,321	1,937,427	6,293,983

Grand total—animals slaughtered under Federal and State inspection during 1955 7,637,129

Number of Animals Inspected and Condemned at State and Federal Establishments in California—1955

Species	State Inspection		Federal Inspection		Total	
	Inspected	Condemned	Inspected	Condemned	Inspected	Condemned
Cattle	446,941	1,227	1,987,943	4,477	2,434,884	5,704
Calves	299,003	2,131	432,292	3,992	731,295	6,123
Sheep	365,916	2,027	1,936,321	9,378	2,302,237	11,405
Swine	228,757	479	1,937,427	4,959	2,166,184	5,438
Goats	2,529	11	325	1	2,854	12
Horses			32,517	130	32,517	130
Total	1,343,146	5,875	6,326,825	22,937	7,669,971	28,812

Estimated Uninspected Slaughter *

Cattle	Calves	Sheep	Swine	Total
29,000	49,000	70,000	89,000	237,000

* Estimated uninspected slaughter includes the following:
Animals slaughtered on farms
Animals slaughtered in uninspected slaughtering establishments located in counties of less than 28,000 population, in which compulsory meat inspection is not operative, and establishments operating under inspection exemption in other counties.

Number of Animals Condemned for Various Diseases—State Inspection—1955

Disease	Cattle		Calves		Sheep		Swine		Goats		Total	
	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.
Actinomycosis	16	6,670	2	175							18	6,845
Anaplasmosis	9	4,140	1	241							10	4,381
Arthritis and other bone diseases	17	7,736	10	583	77	3,310	22	2,691	1	50	127	14,370
Asphyxia	1	380	1	80			3	552			5	1,012
Carditis	213	99,638	6	595	5	278	4	754			228	101,265
Caseous Lymphadenitis					545	24,144	1	110	1	45	547	24,299
Contamination	1	400					3	340			4	740
Cysticercosis	3	1,517			3	152	1	161			7	1,830
Dropsical diseases	22	12,293	6	685	1	40	4	556			33	13,574
Emaciation	76	26,341	315	12,693	591	23,976	8	580	4	95	994	63,685
Erysipelas							7	858			7	858
Hepatitis	2	900					2	256			4	1,156
Hog Cholera							9	820			9	820
Icterus	12	6,900	38	1,855	96	4,572	61	8,468			207	21,795
Immaturity			1,375	47,261			1	195			1,376	47,456
Injuries	21	10,619	13	932	16	754	2	245			52	12,550
Leptospirosis	1	650									1	650
Leukemia	9	4,825			2	93					11	4,918
Melanosis	2	1,012	3	380	1	48	1	120			7	1,560
Metritis	53	27,685	1	400	19	1,095	3	386			76	29,566
Miscellaneous	4	2,045	3	445	2	80	1	120			10	2,690
Nephritis	35	17,042	12	796	5	210	7	1,069			59	19,117
Omphalophlebitis	2	2,100	48	1,767							50	3,867
Parasitic diseases	1	400					1	75			2	475
Pneumonia, Pleurisy, Enteritis, Peritonitis, etc.	219	107,931	202	18,809	496	23,610	200	24,035	2	55	1,119	174,440
Pregnancy and recent parturition	6	2,985									6	2,985
Sarcosporidiosis	15	7,396									15	7,396
Septicemia and Pyemia	367	168,919	59	5,935	166	7,512	102	13,410	2	145	696	195,921
Sexual Odor							27	3,698	1	45	28	3,743
Tetanus	1	400									1	400
Toxemia	7	3,725	29	1,215							36	4,940
Tuberculosis	27	11,671	1	194			5	1,143			33	13,008
Tumors, Carcinomata, Sarcomata, etc.	85	37,529	6	254	2	88	4	654			97	38,525
Total	1,227	573,849	2,131	95,295	2,027	89,962	479	61,296	11	435	5,875	820,837

DIVISION OF MARKETING

W. J. KUHRT, *Chief*

Agricultural Statistics
Fruit and Vegetable Standardization
Market Enforcement
Market News
Markets
Milk Control
Shipping Point Inspection
Weights and Measures

Division of Marketing

W. J. KUHRT, *Chief*

The Division of Marketing is composed of eight bureaus, namely, Markets, Market Enforcement, Market News, Milk Control, Agricultural Statistics, Fruit and Vegetable Standardization, Shipping Point Inspection and Weights and Measures. The Division of Marketing has the responsibility of supervising the work of these bureaus, whose primary duties and responsibilities are outlined below.

1. **Markets.** This bureau performs four principal types of functions as follows:

A. Administers and enforces all marketing orders and programs made effective pursuant to three general enabling statutes.

B. Provides general marketing service to producers.

C. Assists producers in the development and operation of cooperative marketing associations.

D. Carries on survey projects under joint State and Federal Research and Marketing Administration funds to widen markets for California farm products.

2. **Market Enforcement.** Enforcement of the Produce Dealers Act and Processors Law, the regulatory measures enacted to protect producers of farm products.

3. **Market News.** Operation of the Federal-State Market News Service in cooperation with the United States Department of Agriculture. This service reports prices, market conditions, demands, supply, carlot movements, cold storage holdings and other pertinent information at local, state-wide and nation-wide markets.

4. **Milk Control.** Administration and enforcement of two laws affecting production and distribution of market milk and milk products.

A. The Milk Control Act provides a plan for regulation of the California market milk industry to insure an adequate supply of pure and wholesome milk at fair and reasonable prices. This statute requires the director to set the minimum prices which distributors pay producers for their milk, and the minimum wholesale and retail prices at which distributors shall sell their products. Another act relating to marketing of milk and other dairy products establishes the method for regulation of fair trade practices in the dairy products industry.

B. The Bureau of Milk Control cooperates in the administration of the California Dairy Industry Advisory Board Act of 1945. The work of this board, including research, publicity, advertising and education, is financed by the California dairy industry by a levy on the production of butterfat in specified periods.

5. **Agricultural Statistics.** This bureau, also known as the California Cooperative Crop and Livestock Reporting Service, under agreement with the United States Department of Agriculture, develops, prepares, publishes and distributes estimates of the acreage, production and value of all major California crops; records the number and value of the principal species of livestock and poultry, and of the quantity and value of livestock products.

6. **Fruit and Vegetable Standardization.** Administers and enforces minimum state standards for fruits, vegetables, nuts, eggs and honey, as provided in the Agricultural Code. In administering and enforcing these standards, the bureau works closely with the Agricultural Commissioners and their inspectors in each of the counties of the State. In addition to these duties, the bureau administers directly:

A. The canning tomato standards which require compulsory inspection and certification of all loads of tomatoes delivered to canneries, and enforcement of the standards of quality and maturity as certified.

B. The provisions of the code relating to the inspection and certification of seed potatoes to insure freedom from injurious virus, bacterial or fungus diseases.

7. **Shipping Point Inspection.** Carries out the inspection and certification of grade and condition of fruits and vegetables throughout California according to United States standards. This is a voluntary service available to producers and shippers in the State.

8. **Weights and Measures.** Administers and enforces state statutes relating to weights and measures and to petroleum and petroleum products. Employees of the bureau supervise generally the work done in the various counties by county sealers of weights and measures who have the duty of carrying out these statutes in their respective counties.

Bureau of Agricultural Statistics

GEORGE A. SCOTT, *Chief*
NIELS I. NIELSEN, *Assistant Chief*

The Bureau of Agricultural Statistics, commonly known as the California Crop and Livestock Reporting Service, is a service agency and has no regulatory functions. It operates under a cooperative agreement between the California and United States Departments of Agriculture and is jointly supported by these departments. It thus functions simultaneously as a bureau of the State Department of Agriculture and as a field unit of the Agricultural Estimates Division, Agricultural Marketing Service, United States Department of Agriculture. In the latter capacity, the bureau provides basic records and estimates of California agriculture as part of analogous national data. These, together with similar data for other states, form the basis for systematic and continuing statistical records and current service reports for both California and for the United States.

Through such cooperative arrangement, duplication is avoided in rendering necessary public service in the field, and more extensive statistical coverage of the State's agriculture can be made; it permits ready use of much statistical information developed as by-products of normal activities of other bureaus of the department; and it places the bureau in a position to render more effective service to the department and to other state agencies.

Briefly outlined, the principal function of this bureau is to develop, prepare and publish estimates of the acreage, production, average prices and values of all major crops, and corresponding estimates of livestock and poultry in California. In general, forecasts of production are made during the growing season for all principal crops, followed later by estimates of their production and value. Numbers of livestock and poultry are estimated annually, as are items of production and value of the principal livestock and livestock product items. In addition, estimates are made and published covering monthly production of milk and eggs, and of average prices for many farm products. Weekly estimates are made of chicks and poults hatched, and numbers of cattle in feedlots are published quarterly.

In cooperation with county agricultural commissioners, the bureau also maintains records of acreages of all major fruit and nut trees and of grapes. A report showing these acreage data by counties, by principal varieties and by age groups is published each year. The field surveys required to obtain these records have been more comprehensive in recent years through additional state and federal funds made available under the provisions of the Research and Marketing Act of 1946.

The bureau carried on its usual services and reports during 1955 without significant expansion in its staff or marked changes in the character of its functions. The volume of requests for information and for special services continued to be high. Weekly reports were continued on the hatchings of chicks, segregated between layer and meat-type chicks, and the placements of chicks for feeding out as broilers and fryers. Companion reports on hatchings of turkey poults were also issued, as well as the quarterly surveys and reports of cattle in feedlots. The annual surveys and reports of raisin production were reinstated, through the availability of industry funds.

It is not feasible to include in this report the detailed statistical data contained in the large number of mimeographed and processed reports published by the bureau. Such reports are issued to provide producers and the public in general with current information about prospective and actual farm production, acreage changes, price trends and general conditions affecting agriculture. Appropriate summary reports are published and made available to those who request and need them. Copies of all such reports are available in the bureau. During the fiscal year ending June 30, 1955, the bureau published 272 separate reports for distribution, including several small statistical bulletins containing a limited volume of comprehensive historical data.

It is appropriate here to record that the statistics and related information made avail-

able to the public by this bureau are primarily based on the loyal cooperation of thousands of farmers, stockmen, dealers, processors and warehousemen who make reports directly to this office, and upon information and reports made available by many other individuals and firms identified with the State's farming industry. This long-standing voluntary cooperative arrangement between people engaged in various phases of the California agricultural industry and the department is both unique and effective. Most primary information is obtained quickly by mail at low cost. In turn, the estimates and information published by the bureau are free from intentional bias and distortion and are promptly made available to thousands of farmers and to others in the State who want them.

Year-to-year changes among the highly diversified and varied types of farm enterprises in the State form an irregular and somewhat mixed pattern, and the records of different segments of the industry do not always clearly disclose underlying major trends. This brief report can touch upon only those recent developments in the State's agriculture which appear most significant. These relate to over-all farm production achievements in 1955, to the principal changes which have occurred, and to the economic position of agriculture as indicated by general price and gross value comparisons for recent years.

Upward Trend Continues in Annual Crop Production

The combined production of the principal crops grown in California during 1955 was 28,228,000 tons. This marks a new high record in aggregate output of crops in this State. It is 3 percent more than the next highest tonnage grown in 1954 and was 52 percent greater than the average output in the 1937-41 period. Crop tonnage data for each of the main crop groups for recent years are shown in Table 1. These figures clearly disclose the big expansion that has been recorded in the State's aggregate crop production during recent years. Not reflected in the figures is the big increase in the acreage of irrigated pastures, which has grown from about 235,000 acres in 1940 to approximately 825,000 acres, and now ranks as one of the State's important "crops."

The combined tonnage of field crops grown in California during 1955 was about

TABLE 1

Combined Production of Crops in California

(Excluding Certain Minor Crops and Others Indicated)

(Thousand Tons)

	Fruit and nut crops[a]	Vegetable crops[b]	Field crops	Totals
Average 1937-41	6,267	2,397	10,047	18,711
Average 1942-46	7,073	3,400	10,998	21,471
1947	7,556	4,066	13,009	24,631
1948	7,001	3,676	12,809	23,486
1949	6,314	3,780	12,812	22,906
1950	6,370	3,956	15,137	25,463
1951	7,644	5,262	12,703	25,609
1952	6,931	5,069	13,949	25,949
1953	6,703	4,838	14,770	26,311
1954	6,256	4,791	16,502	27,549
1955[c]	7,148	5,440	15,640	28,228

[a] Excludes dates, nectarines, and minor fruits.
[b] Excludes potatoes, which are included in "field crops."
[c] Preliminary for 1955.

5 percent below the record volume produced in 1954, but was 43 percent more than the average volume recorded during the 1942-46 period. Smaller crops of cotton, wheat, rice and sugar beets were raised in 1955 because of reduced acreages under the national allotment programs, while comparatively large crops of hay, potatoes, corn and grain sorghums were grown.

The over-all output of the principal fruit and nut crops in the State during 1955 exceeded that for 1954 by 14 percent and was slightly above average. The large grape crop of 1955 accounted for a considerable part of the increase. Among the 1955 crops with relatively high but not record output were apricots, avocados, cherries, grapes, oranges, peaches, plums and walnuts. The State's production accounts for about 43 percent of the United States total for this group of crops.

The combined production of vegetables in the State during 1955 was the highest of record, 14 percent higher than in 1954 and 60 percent above the average for the 1942-46 period. The 1955 crop of canning tomatoes was exceptionally large. About 32 percent of the 1955 national production of commercial vegetables for fresh market and for processing was grown in California.

Weather factors affecting development and production of California crops during the 1955 season were generally favorable. Some losses and reduction in yields occur each year because of adverse weather conditions, plant diseases and insect injuries, but such losses were not excessive in 1955

if considered in terms of over-all production. However, comparatively severe losses were sustained in some crops and localities. With few exceptions, crop yields were good, and for some crops unusually high yields were recorded.

The remarkable increase in the State's total output of crops during the past 25 years has been brought about by a number of factors. A great deal more land has been brought under irrigation and crop production in this period, and the combined acreage of crops grown has steadily expanded, until in 1954 it was the largest in the State's history. In addition, other factors have contributed heavily to the increase. Among these are the rapid mechanization of farming operations; greatly increased use of fertilizers; improvements in farm practices and in the control of insects, plant diseases and weeds; and in the development and extensive use of improved crop varieties adapted to local conditions.

Records of quantities of the several livestock and poultry commodities produced are not reducible to a realistic common denominator. Complete data on these items for 1955 are not yet available, but information now accessible indicates that the State's farmers and stockmen marketed more milk, beef and eggs than in any previous year, while the output of chickens and turkeys was at near-record volumes. Feedlot finishing of cattle continued its rapid expansion, establishing California among the top three states in this important enterprise. Sheep and wool production is currently stabilized at about 40 percent below that of 1942. Hog raising in the State was about at the lowest point in more than 85 years.

Crop Values and Farm Income Continue at High Levels

The aggregate farm value of the principal crops grown in California last year amounted to $1,675,500,000. Although this was about 3 percent more than recorded for 1954 crops and 5 percent below the record high level reached in 1951 and 1952, it exceeded the 1942-46 average value by 36 percent. The annual value of crops grown in California far exceeds that for any other state.

The combined value of fruit and nut crops grown in 1955 was 9 percent higher than for 1954 crops. The total value of 1955 vegetable crops exceeded 1954 by 12 percent and established a new high record

TABLE 2
Combined Farm Value of Principal Crops in California
(Thousand Dollars)

	Fruit and nut crops[a]	Vegetable crops[b]	Field crops	Totals
Average 1937-41	181,729	96,889	174,801	453,419
Average 1942-46	581,635	239,007	407,553	1,228,195
1947	428,808	317,641	664,396	1,410,845
1948	418,109	287,727	658,434	1,364,270
1949	357,614	289,501	612,080	1,259,195
1950	506,790	287,172	683,872	1,477,834
1951	503,543	379,508	882,402	1,765,453
1952	447,511	375,656	945,334	1,768,501
1953	454,758	366,155	765,615	1,586,528
1954	470,201	360,494	791,332	1,622,027
1955[c]	513,069	405,020	757,411	1,675,500

[a] Excludes dates, nectarines, and minor fruits.
[b] Excludes potatoes, which are included in "field crops."
[c] Preliminary for 1955.

value for the group. The combined value of 1955 field crops was 3 percent lower than for 1954 and was the lowest in the past five years. Compared with the 1942-46 average, the value of 1955 fruits was down 12 percent; for vegetables it was higher by 70 percent; and for field crops higher by 86 percent. Cotton still ranks as the leading California crop in terms of value.

Table 2 shows the combined values for each of the three major crop groups and the grand total for each of the most recent nine years, as well as averages of these values for immediately preceding periods. These data provide a useful dollar measure of the year-by-year changes and trends of over-all values for each crop group and for all crops produced in the State. These crop value figures represent gross farm values of the entire production of crops sold and used on farms; they do not represent income to farmers nor do they afford relative measure of net income between years.

Estimates of cash returns to producers from sales of livestock, wool, milk, eggs and poultry during 1955 are not available at the time this report is prepared. However, it is apparent that the combined returns to producers from these sources last year were little different than they were in 1954. Returns from meat animals may have been slightly less than for the preceding year, while returns from poultry, eggs and milk were a little larger. Cash returns from livestock and poultry normally comprise about 37 percent of the State's total calendar year cash receipts for the sales of all farm products.

Farm Price Index and Parity Ratio Lower

The general level of prices received by farmers for farm products declined further during 1955, continuing the downward trend in effect during the preceding three years. These price level changes are best shown by the monthly and annual national index numbers of prices received by farmers. In December, 1955, this index stood at 223, which was 16 points or 7 percent lower than recorded a year earlier and 29 percent below the recent high of 313 recorded in February, 1951.

Price declines nationally during 1955 were most severe for hogs, cattle, corn, oats, beans, cotton seed, potatoes and alfalfa seed. In addition, California producers experienced a sharp decline in the over-all price of grapes. However, prices of some commodities brought better prices in 1955 than during the preceding year. Among California crops with better prices can be mentioned asparagus, tomatoes, hay, peaches, prunes, olives, figs, almonds, walnuts, eggs and poultry.

In contrast with the declining price trends for most farm products, farmers' over-all costs of labor, machinery, materials, supplies, services, interest and taxes increased slightly during 1955, as shown by the national index of these costs as a group.

This index in December, 1955, stood at 279, the same as a year earlier and only 4 percent below the high peak reached in 1952. The ratio between this index and that for prices received by farmers, noted in the preceding paragraph and known as the parity ratio, reflects the economic position of farmers as compared with other segments of the national economy. The parity ratio in December, 1955, was 80, down 7 percent from a year earlier and 35 percent below the high point recorded in 1946. Thus, the economic position of farmers as a group became still less favorable during the year, and by the end of the year had reached the lowest level since 1940. Moreover, the costs of processing, transporting and distributing farm commodities continue to increase, so that the reduced prices of farm commodities at the farm level are not proportionately reflected in the prices that consumers pay for them. The farmer's share of the consumer food dollar has declined from 53 percent in 1945 to 41 percent in 1955.

Research and Marketing Act and Special Projects

In addition to performing its usual functions, the bureau in recent years has engaged in certain research and service activities which directly relate to its basic functions. Such activties are principally supported by state and federal funds made available under the provisions of the Federal Research and Marketing Act of 1946, and in part by funds made available by local grower-industry groups, in some instances matched with federal funds. The bureau's work in these special projects principally grew out of requests from certain commodity groups in the State for greater precision in the bureau's forecasts and estimates of production, relating particularly to crops involved under state or federal marketing orders. Other phases of similar activities relate to the development and dissemination of basic data on actual and potential crop production and distribution. Thus, these activities have been undertaken to enlarge and improve the bureau's basic services and to explore and test alternative methods for estimating crops, which methods may have application for other crops here or elsewhere. In the research phases of these projects the bureau fortunately has had the active technical assistance of members of the Agricultural Experiment Station and the Giannini Foundation of Agricultural Economics of the University of California. The statements in this report merely sketch the type and progress of activtities carried on under these projects, without enlarging upon details of operations or results.

The annual surveys of bearing and nonbearing acreages of the State's major fruit and tree nut crops are made more complete through the use of Research and Marketing Act funds in conducting the necessary extensive field work. The information acquired in these surveys shows the acreages of these crops in detail by kinds, by varieties, by age groups and by counties. The work is carried out in cooperation with county agricultural commissioners. Under this arrangement and support, systematic and comprehensive records of these acreages are maintained year by year. A bulletin is published annually recording such data. The information is widely used by individuals, groups and agencies identified in producing, processing and marketing these crops.

An annual survey of the acreage of principal types of bushberries grown in California is made each year, and an appropriate brief report is published for the use of growers, processors and others engaged in marketing these crops.

The bureau is engaged in exploratory work testing objective sampling techniques as a basis for forecasting and estimating fruit production. During the preceding three years this type of operation has been concentrated on Bartlett pears and cling peaches; the work in the first two years was supported entirely by funds provided by these commodity groups operating under state marketing orders. This activity was continued during 1955 through the use of matching Research and Marketing Act funds. This type of research work involves many problems in obtaining complete and precise statistical observations over wide areas. In addition, it is difficult to identify and account for the influence on fruit production of many factors other than the counts and sizes of fruits on trees at various intervals. Thus, progress toward developing standardized procedures and techniques is necessarily slow. However, early season forecasts which have been made during the past three seasons based upon these methods have been highly encouraging, and it is believed that the project will produce workable techniques for making dependable forecasts and estimates.

At the request of the Lemon By-Products Advisory Board operating under a state marketing order, and the Walnut Control Board operating under a federal marketing order, pilot studies for developing and testing objective sampling methodology for estimating these two crops were begun in 1955. Funds for carrying out these pilot projects were made available under these industry marketing orders. Procedures used are similar to those employed in the projects noted above, but with important modifications demanded by differences in crop characteristics. In order to develop and test these techniques satisfactorily, several seasons of exploration and experimentation are required.

In addition, through the use of funds made available by the Wine Advisory Board, the bureau made surveys and published reports on the production of natural raisins during and after the harvest season of 1955. This work represented a current reinstatement of similar activities carried on by the bureau for the five-year period prior to 1954. While basic sampling methods for it have been established, further development or extension of the techniques employed are made each season in order to improve dependability of the resulting estimates.

Bureau of Fruit and Vegetable Standardization

H. W. POULSEN, ***Chief***

S. R. WHIPPLE, ***Assistant Chief***

Standardization enforcement work throughout California includes the direction of 52 county agricultural commissioners and their staffs in the enforcement of quality standards and the requirements to prevent deceptive packing and mislabeling, as provided in the Agricultural Code; these standards and requirements apply to eggs, honey, walnuts and 35 important fruits and vegetables produced in this State. In addition, all other fresh fruits and vegetables not governed by specific standards are regulated as to serious decay, insect damage, deception in packing and mislabeling.

Administration of seed potato certification and the maintenance of seed potato test plots are functions of this bureau. These services are optional, supported by fees paid by growers.

The canning tomato inspection service, another self-supporting function, requires the inspection of all canning tomatoes; such inspection is compulsory and is supported through fees paid on an equal basis by grower and canner.

The work load of the bureau has increased considerably in the last few years, some years more than others, of course. However, if the average of the past five years is used as a base and compared with the 1955 figures, the increase is as follows:

Fruit and vegetable standardization	10%
Highway inspection stations	15%
Egg standardization	9%
Canning tomato inspection	29%

(NOTE: Seed potato certification shows a 14 percent decrease in the above six-year comparison; however, there is a 9 percent increase in 1955 over 1954. Volume of shipments would be an unreliable basis in comparing the increase of general enforcement work in functions such as fruit and vegetable standardization and egg standardization, because the entire marketed volume is not inspected; therefore, figures are based on the number of violations. On the other hand, since all produce trucks are required to stop for inspection at highway inspection stations (in the case of canning tomato inspection the inspection of every load is compulsory), volume is a valid base and has been used. Acres entered for inspection were used for seed potato certification, because that is a reliable work load measurement.)

STANDARDIZATION ENFORCEMENT

(Fruits, Nuts, Vegetables, Honey, and Eggs)

The quality, packing, container and marking requirements of the Agricultural Code applying to fruit, vegetables, honey, eggs and walnuts are for the purpose of maintaining and improving the reputation of California products in our own markets, as well as in markets throughout the Nation, and to protect the consumer from fraud, mislabeling and deception. The large volume of commodities produced and consumed in California is inspected and regulated in producing areas, wholesale markets and retail stores throughout the State.

County agricultural commissioners, their deputies and inspectors enforce these laws under the direction and supervision of this bureau. Inspections throughout the State during 1955 resulted in 12,067 rejections involving 808,545 packages, in addition to 1,229 tons of various fruits and vegetables. The number of rejections for 1955 shows an increase of 2½ percent above 1954.

In the case of grapes, shipments started June 1st from Coachella Valley; soon after this, harvesting started in the Borego and Imperial Valleys, then Kern County and later Tulare and Fresno Counties. A large part of the time, as each of these districts started, almost every lot packed was tested for compliance with the minimum soluble solids maturity requirements.

The Beaumont Highway Inspection Station, operated by personnel of this bureau on the highway between the Coachella and Imperial Valley producing districts and the large wholesale and retail distributing area in Los Angeles, inspected and tested many truckloads of these grapes. A large number of rejections were made because of immaturity. County agricultural commissioners in the large grape producing areas added additional inspectors to their regular staffs to inspect grapes.

When Thompson Seedless and Cardinal grapes in the San Joaquin Valley districts were ready, the soluble solids minimum, in some cases, was difficult to meet. However, an alternative soluble solids to acid ratio test is provided in the law for these two varieties (and the Blackrose), and proved very helpful because cool weather during 1955 delayed the normal soluble solids increase.

After a cool, slow-ripening period, an extremely hot spell occurred which burned many grapes on the vines; the effect of standardization enforcement was to require packers to cull heavily at the time of packing, both for immaturity as well as burned grapes, in order that grapes for shipment might meet the requirements. A large number of rejections were made.

About one-third of the grapes shipped to the Southern California marketing area and checked at our Castaic Highway Inspection Station are packed in odd-sized containers, such as apple boxes, field picking boxes, citrus boxes, etc.; in many instances these grapes were to be repacked at destination into standard containers; however, a careful check was maintained at all bureau highway stations within the State and in wholesale markets to be sure all requirements were met.

Complete regulations were established by the director, after public hearing, pertaining to methods of testing wine grapes for soluble-solids content. These regulations were applied during 1955 for the first time and proved very successful.

Section 801.5 of the Agricultural Code provides that grapes intended for wine-making may proceed to adjoining states, by permit, in nonstandard containers. Baja California is not mentioned as an adjoining state; however, an injunction obtained by several San Diego County growers had the effect of requiring agricultural commissioners to issue permits under Section 801.5, for grapes to be transported to Baja California in nonstandard containers.

Representatives of this bureau participated in the grape testing from Borego and Coachella Valleys to Kern, Tulare, and Fresno Counties, to assure uniformity of testing procedures and efficient enforcement.

Low temperatures which occurred in citrus-producing areas during January and February, 1955, resulted in freezing injury to oranges. Freezing damage to citrus was not a general problem, but careful inspection

was maintained throughout the year. As a result of surveys pertaining to the development of frost damage, the director established Date A as March 16th, and Date B as April 1st; the effect of this regulation was to provide that during the period between these dates, oranges were to be inspected for symptoms of frost damage by two methods (center cut and segment cut) instead of only one of these methods, which was the case before Date A. After April 1st only the center cut was used. All reports indicated that this procedure has proved successful.

The newly established maturity standards for oranges were effective this season. Meetings were held prior to the harvest season with industry representatives, affected growers and enforcement officers; the new standards were discussed and uniform compliance was obtained. The change was intended to improve the color and maturity of oranges at time of picking; reports indicate the desired results of better color and maturity were obtained.

Commissioners in potato-producing areas, and in counties where wholesale markets are located as well as where by-product plants operate, experienced serious difficulty because of cull potatoes. In producing counties, regular permits are issued for selling, transporting and receiving by-product loads; checking such loads at destination requires a considerable amount of work. Frequently, instead of being delivered to a by-product plant, the loads of cull potatoes are traced to a wholesale produce market or a retail store where they must be rejected because of excessive defects.

Newly established quality standards were in effect in late potato-producing areas. The object of the legislative change was to establish minimum standards somewhat comparable to the U. S. No. 2 Grade. State marketing orders, in effect at the same time and requiring similar grades, provided inspection in producing areas on potatoes for fresh marketing.

In wholesale market areas, a large number of rejections were made because of heavy bruising on potatoes from Santa Maria and Washington State. This is a difficult situation, because this peculiar blackening is not readily apparent at time of shipment; the damage frequently appears shortly after arriving at destination.

In avocado-producing areas and in areas where wholesale markets are located, difficulty was experienced because of frost damage. Several meetings were attended by agricultural commissioners and representatives of this bureau with avocado growers and packers in order to discuss uniformity of sampling and inspection. It was evident that these meetings and regular inspection work obtained good compliance.

Enforcing officer shown here is examining Tokay grapes for quality requirements of California Agricultural Code

Fall apples, which arrived in large quantities in many wholesale markets in California, were very often affected by internal browning; this is a defect not easily determined from outside appearance, but which, in many cases, causes the apple to be unusable. A large number of rejections were made. Also, some states have lower grade requirements for apples of the Extra Fancy and Fancy grades; we were particularly affected because of defects such as broken skin and stem punctures. The director, by regulation, established that apples may be marked with a U. S. grade comparable to our state grades. The apples in question would not meet California Standards, but they would meet U. S. Standards, so this action relieved the situation somewhat.

A number of other problems during the year caused difficulties for commissioners, their inspectors and bureau representatives; namely, rejections of mushrooms, eggplant, squash, bell peppers and asparagus because of deceptive packing; lettuce rejections because of slime and worm damage; rejections

TABLE 1

Summary of Highway Inspection Station Activities—1955

Station	Total packages	Estimated total Carloads†	Period of operation
Beaumont	13,779,435	27,559	January 1-August 6, and October 2-December 31
Carpinteria	6,411,079	12,825	January 1-December 31
Castaic	5,778,925	11,558	June 13-September 23
Livermore	1,913,179	5,826	June 13-September 23
Pacheco Pass	2,459,337	4,919	June 13-September 23
Solemint	146,892	294	July 11-August 31
	30,488,847	62,981	Fruits and vegetables
		6,222	Watermelons*
		69,208	

* Totals for watermelons are not included in the individual station totals, therefore, the estimated total carloads of watermelons has been added to the over-all total.
† Carlot conversion figures of 500 packages used.

of apples because of sunburn; celery rejections because of frost damage; honeydew melon rejections because of low maturity; an increase of rejections for strawberries because of mold; rejections of plums because of low maturity and deceptive packing, and the rejection of onions because of decay.

Standard containers became a difficult enforcement problem because there is a general industry trend whereby types and sizes of containers are being changed. A number of permits were issued so that a limited volume of experimental containers could be used in lieu of standard containers; the director established several containers as standard under Section 790.5 of the Agricultural Code. Many receivers have imported products in nonstandard containers, which is a continuing interstate problem.

Highway inspection stations have been maintained at several strategic locations on main highways for examination of produce being hauled by truck from the large producing and packing districts into large marketing areas. The stations are operated seasonally every year, and funds are provided permanently. At the six stations operated, the equivalent of 69,208 carloads of produce was passed on clearances or inspected at the stations; this amount is an increase of 3 percent over the previous year. Of the total inspected, 33,301 packages of fruits and vegetables, and 75 tons of watermelons were rejected. Table 1 shows location, period of operation and volume inspected at these stations.

Bureau inspectors at these highway inspection stations also cooperated in the administration of marketing orders effective under state and federal laws. This service was rendered at the Beaumont Inspection Station with reference to grapefruit; at the Carpinteria Inspection Station involving lettuce and plums, and at the other stations within the State for deciduous fruit and cantaloupes. These inspections require checking of truckloads of the above commodities to determine if evidence of compliance with a particular marketing order accompanies the load. If the records which accompany loads are not complete, information on the facts in each case is quickly relayed to the proper enforcing agency.

Representatives of this bureau also assisted with supervision of standardization inspection work at Border Quarantine Stations.

Eggs

More than 52,555 lots of eggs, representing 433,030 cases, were inspected by agricultural commissioners, their inspectors and members of this bureau, which is an increase of 41 percent over 1954. As a result of this work, 2,264 violation notices were issued. Mislabeling as to quality and size was responsible for most of these rejections, and inedibles accounted for the balance.

Extremely high temperatures were severe enough during a short period in the summer to cause a slow down in local egg production. As a result some retailers attempted to sell low quality eggs. However, good enforcement was maintained, and the general quality of eggs available to consumers was held at normal.

Emergency Standards and Department Regulations

Two emergency standards under Section 790.5 were issued by the department, pertaining to carrot and sweet potato standard

TABLE 2

First and Second Field Inspections and Tagging Operations by Acres and Months—1955

	Acres Jan.-Mar.	Acres Apr.-June	Acres July-Sept.	Acres Oct.-Dec.	Acres Total
First field inspections	--	401	4,768	123	5,292
Second field inspections	--	138	3,934	963	5,035
Grading and tagging	1,910	329	203	1,384	3,826

containers. Regulations were issued by the director, pertaining to (1) establishing Date A and Date B in connection with Section 795 of the code, (2) methods for testing soluble solids of wine grapes, (3) fruit and vegetable standardization inspection methods, (4) seed potato certification inspection methods, and (5) U. S. grades for apples.

Standardization Marketing Surveys

With funds furnished equally by the Research and Marketing Administration, United States Department of Agriculture, and the State of California by act of the Legislature, the Bureau of Fruit and Vegetable Standardization made investigations on eight projects; namely, maturity standards for watermelons and persian melons; freezing damage measurement in Washington navel and Valencia oranges; comparative temperature correction when testing grapes; quality standards for cello-pack carrots; sizing standards for tangerines; sizing standards for Bartlett pears, and testing of grape juice extracted by hand, compared to extraction by motor-driven roller-type extractor.

Some of these studies should be continued in order to obtain final and conclusive information. Results to date have been of material assistance to industry members and enforcement officials.

Seed Potatoes

The purpose of the seed potato certification program is to provide California growers with disease-free stocks of seed which will produce more tons per acre of high quality commercial potatoes.

Varieties of potatoes certified in 1955 were: White Rose, 3,523 acres; Netted Gem, 1,179 acres; Pontiac, 163 acres; and Kennebec, 427 acres; first field inspections were made on 5,292 acres (a 9 percent increase over last year); second field inspections were made on 5,035 acres, and official certification tags were placed on sacks of seed potatoes harvested from 3,826 acres. Also, 257 acres were withdrawn by growers for various reasons or were rejected after field inspections by representatives of the bureau. This is a better record for growers than in 1954 when 415 acres had to be withdrawn or rejected.

Test plots were conducted at Half Moon Bay and Oceanside. At Half Moon Bay, samples of most of the seed sources grown by growers were tested during spring to obtain necessary enforcement data on stocks entered for certification. Samples from many of the fields produced under certification were tested during winter at Oceanside. The regulations require that the performance of the "Foundation Stock" seed potatoes be tested by growing under controlled conditions, and the Oceanside winter test plot is maintained for this purpose.

Table 2 shows the acres inspected by months.

Canning Tomato Inspection

Sections of the Agricultural Code relating to this function provide that every load of tomatoes delivered for canning purposes must be inspected, and a certificate will be issued if the load meets requirements. The object of the law is to prevent delivery of unsuitable canning tomatoes and to provide both grower and canner with the accurate percentage of defects in every load delivered. During 1955, there were 2,050,616 tons of canning tomatoes inspected and passed, an increase of 47 percent over the previous year, and 34,320 tons inspected and rejected.

Inspection was conducted at 143 inspection stations, 57 located at canneries and 86 at field assembly stations. Inspections began in Imperial Valley early in May. In the northern areas the main season started in July, with peak inspections made in August, September, and October; inspections were finished in November. During the peak of the season 370 inspectors were employed.

Northern area inspections started slowly and continued several weeks at that pace. In August about 50,000 tons per week were

inspected, but by the middle of September inspections had jumped to 300,000 tons per week. There were unusually high peaks of volume.

Extreme hot weather, which occurred about the middle of the season, had the effect of cooking many tomatoes on the vines and caused inspection difficulties. Also, low temperatures in the latter part of the season caused freezing damage in most of the growing areas. Both these defects are difficult for the pickers to see, and since they develop rapidly in transit to the grading stations, the inspection of such loads of tomatoes is very difficult.

Legislation

The 1955 Legislature enacted 17 measures in the Agricultural Code, which affect the work of this bureau. These actions created poultry meat classes, amended the seed potato certification provisions, and others amended the fruit, nut and vegetable standards of the code. Four of the legislative enactments contained urgency clauses making them effective when signed by the Governor; the others were effective September 7th.

The several amendments, briefly stated, accomplished the following: provided a higher color and maturity requirement for oranges; corrected the dimensions of the new standard one-half box (carton); permitted the marking of citrus fruits, loose in the new one-half box, only within the State, without the necessity of showing the specified counts and average diameters if the boxes are not closed, and permitted a tolerance of 5 percent in excess of the count as marked on these containers if the fruits are packed, and legislative changes relating to standard containers for other commodities; established a box for a one-layer pack of nectarines, a fibreboard box for plums, a new shallow depth (three and seven-eighths inches) for the standard lug box for peaches, nectarines and plums, a deeper depth (6¾ inches) for the standard lug box for peaches, a greater range of dimensions in depth and width at the bottom of the tapered grape lug, a standard container for sweet potatoes, an additional standard container for cantaloupes, and a new series of containers for carrots and lettuce. The special experimental container provisions for containers of lettuce and carrots were repealed.

Other legislative amendments pertained to markings required on containers of lettuce and carrots; packing of lettuce; variety classifications for grapes; maturity testing of grapes; labeling of containers of grapes; the defect "live insects" in potatoes; the tolerance of defects permitted in containers of potatoes; a new optional "California Standard" grade for potatoes; shipments of substandard apples to points outside of the State for by-product uses; the addition of a new defect (green shrivel) to the standards for dates; procedures for the rejection of noncomplying fruits, nuts and vegetables, and permits required to transport substandard fruits, nuts and vegetables for by-product uses within the State.

Also the legislation established a new law, effective July 1, 1956, assigned to this bureau and county agricultural commissioners for enforcement, which requires compulsory grade classification markings on carcasses of poultry, turkeys and rabbits, and on containers of such products when cut up.

The seed potato certification provisions of the code were amended to provide that funds collected be placed in a special fund.

Bureau of Markets

DR. E. W. BRAUN, *Chief*

J. F. BENNETT, *Assistant Chief*

The Bureau of Markets carried on activities of three general categories during 1955, namely, the administration and enforcement of industry self-help marketing order programs; the handling of marketing surveys in cooperation with the Federal Research and Marketing Act of 1946; and the providing of general marketing service.

Industry Self-help Marketing Programs

The staff of the bureau devoted the major portion of its time to administration and enforcement of industry self-help marketing programs. These programs are authorized by the Agricultural Code, particularly the California Marketing Act of 1937 and the Agricultural Producers Marketing Law, being Chapters 10 and 11, respectively, Division 6 of the code.

Such programs are formulated and administered by the industry concerned, with general assistance and supervision by the Department of Agriculture. Programs are financed by industry assessments uniformly applied upon the products marketed. The expense of carrying out these programs is not borne by California general tax funds.

Each industry self-help marketing program embraces a single commodity and is directly applicable on a uniform basis to producers or to handlers, or to both producers and handlers of the commodity. These programs provide for one or more of the following types of regulations or activities initiated to avoid or correct adverse marketing conditions:

1. Provisions for controlling volume of the commodity which may be marketed so as to balance supplies with reasonable market requirements.

2. Establishment of minimum grade, size, quality, condition or maturity specifications for the commodity and provisions for uniform inspection and certification.

3. Provisions for advertising and trade promotion for the commodity, including measures to prevent, modify or eliminate trade barriers and to develop new and expanded markets.

4. Provisions for carrying on research in current problems of production, processing and distribution of the commodity.

5. Provisions for control or prevention of unfair trade practices in the processing and handling of the commodity.

Active Programs

A total of 28 industry self-help marketing programs were in active operation at the close of 1955. Summary facts related to these programs are:

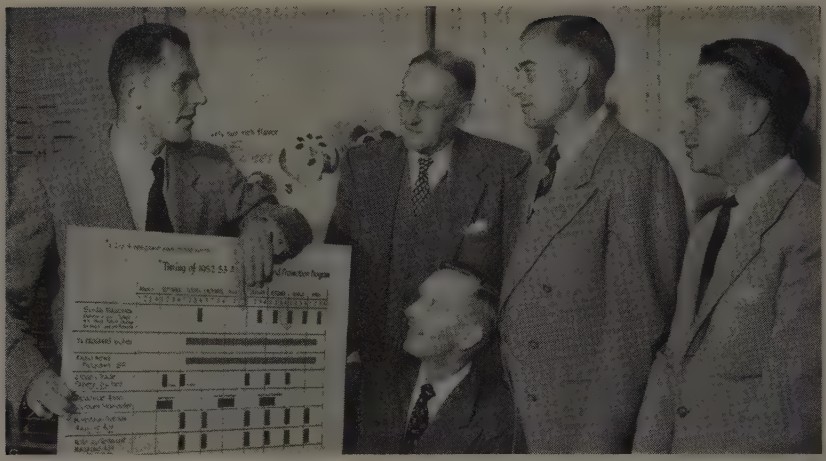
Number of producers directly affected	34,763
Number of handlers	2,969
Producer value of products regulated	$390,000,000
Total assessments collected	$7,798,700
Expenditures for market expansion	$4,635,300
Administration, inspection, and enforcement	$1,943,400
Expenditures for research	$321,500

The 31 programs in active operation during some portion of 1955 were:

Early apples; fresh asparagus; processing asparagus; bedding plants—terminated April 30, 1955; bush berries; cantaloupes; dried figs; grapefruit (grade and size); extracted honey; lemon products; dry-pack lettuce; lima beans (standard); olives, canned and green—terminated June 30, 1955; canning and freezing cling peaches; fresh peaches; fresh Bartlett pears; canning Bartlett pears; fresh Bartlett pear promotion; canning fall and winter pears; fresh fall and winter pears; Hardy pears; fresh plums; delta white potatoes; long white potatoes; poultry improvement (combined with turkey breeding improvement effective October 1, 1955); dried prunes; raisins; strawberries; turkey breeding improvement (combined with poultry improvement effective October 1, 1955); turkey promotion; and wine.

Programs Terminated

The Marketing Order for California Bedding Plants which became effective July 18, 1951, was terminated effective April 30, 1955. Action to terminate the marketing order was taken by the Director of Agriculture following litigation of the case of



The manager of the California Prune Advisory Board, Ray Jewell (seated), confers on advertising plans for California dried prunes. Standing (left to right) Jack Buker and Stanley Swanberg of the advertising agency; Harold Brogger, Assistant Prune Board Manager; Frank Scott, field representative.

"*People* v. *Asamoto*." In this case the District Court of Appeals, Second Appellate District, Division One, held that the marketing order was constitutionally invalid; bedding plants are not sufficiently clothed with public use, the court ruled, to be considered within terms of the California Marketing Act and the exercise of the State's police powers. The California Supreme Court denied a petition of the Director of Agriculture to review the decision of the appellate court.

The Marketing Order for California Canned Olives and California Green Olives, which had been in effect for several years, terminated by its own provisions on June 30, 1955. Prior to this termination, an Amended Marketing Order for California Canned Olives had been issued for written assent of olive growers and processors. The proposed amended marketing order contained provisions for continuing quality standards, an advertising program and authorization for surplus control and stabilization operations. Although sufficient assents were received from olive growers by both number and volume to meet requirements of the law, assents received from olive canners were not sufficient to enable the director to make the marketing order effective.

Subsequently, at the request of an industry committee, a public hearing was held August 11, 1955, upon a Proposed Marketing Order for California Canned Olives, which provided for renewing the advertising and quality programs but omitted the surplus control and stabilization provisions. Testimony at the public hearing disclosed that the industry, particularly processors, was so divided over the issue of surplus control and stabilization that there was no possibility of early approval of the proposed marketing order by canners; doubt that grower approval could be secured was also apparent. In view of these circumstances and the relatively short period of time remaining before commencement of deliveries of 1955 crop olives, the department concluded that the proposed marketing order should not be issued for assent.

New Programs

Three new marketing order programs were made effective during 1955, applicable to Hardy pears, cantaloupes and strawberries, respectively.

The Marketing Order for the Promotion of Hardy Pears for Canning, effective July 11, 1955, provided for sales promotion, market development and research. The Advisory Board plans to contribute funds, beginning in 1956, to the Fruit Cocktail Advertising Program carried on jointly by the Canning Bartlett Pear Committee and the Cling Peach Advisory Board.

The Marketing Order for California Cantaloupes became effective August 1, 1955, applicable to all cantaloupes produced in California during the midsummer season. The marketing order authorizes regulations with respect to grades and sizes of cantaloupes which may be marketed and types of containers which may be used. Provision also is made for inspection of marketed cantaloupes to determine compliance with marketing regulations.

The Marketing Order for California Strawberries which became effective July 7, 1955, is applicable to all strawberries processed in California and all fresh strawberries shipped out of the State. Principal objective of the program is to promote the sale of California strawberries. The marketing order also authorizes research, collection and dissemination of marketing information.

A committee, representative of producers and handlers of California fresh plums marketed in interstate commerce, was assisted by the Bureau of Markets in formulating a proposed marketing order for interstate sales promotion. A public hearing was held thereon and the proposed marketing order was issued on June 3, 1955, for written assent of producers and handlers. Although no testimony or evidence in opposition to any provisions of the proposed marketing order were submitted at the public hearing, the written assents filed by the industry were insufficient to meet the requirements of the Marketing Act.

Amendments of Marketing Programs

During 1955 three marketing orders were amended by major amendment procedures which require the same procedural steps as those applicable to the original formulation of a marketing order. The Marketing Order for Sales Promotion of Fresh Bartlett Pears, originally issued to be effective from June 27, 1950, to March 15, 1955, was amended effective March 2, 1955, to make the term of the program continuous with provision for a referendum of the industry at least every five years.

The California desert grapefruit industry approved an amended marketing order which became effective November 1, 1955, combining provisions for grade, size, maturity and pack regulations with authorization for sales promotion and research, which had previously been contained in two separate marketing orders.

The Marketing Order for Long White Potatoes was amended effective December 20, 1955, to expand application of the marketing order to include potatoes for processing and potatoes for export. Previously the marketing order had applied only to potatoes for fresh table use. The amended program also modified maturity specifications and doubled the number of producers on the advisory board to afford a more representative producer membership.

The Marketing Agreement for Poultry Improvement and the Marketing Agreement for Turkey Breeding Improvement were combined into a single Marketing Agreement for Poultry and Turkey Improvement during 1955; amendments were incorporated to reflect changes in the national poultry and turkey improvement plans. Principal recent changes in these plans provide control of fowl typhoid disease, in addition to pullorum disease control, and strengthen minimum requirements of approved control measures. The combined Marketing Agreement for Poultry and Turkey Improvement became effective October 1, 1955.

A marketing agreement differs from a marketing order in that provisions of an agreement are applicable only to those producers and handlers who are signatory to the agreement; a marketing order, when issued under procedures prescribed by law, is applicable to all producers, all handlers, or both all producers and handlers, as the case may be for the commodity covered.

Minor amendments of a clarifying character were adopted in 1955 for the Marketing Order for Delta White Potatoes and the Marketing Order for Wine. The effective dates of these minor amendments were August 10, 1955, and August 15, 1955, respectively.

Auditing and Enforcement

Administrative audits are made continuously in order to assure collection of all assessments due. It has been bureau policy to audit the records of all parties responsible for payments of assessments following the first year's operation of a marketing order, if it is reasonably possible to do so. The extent of subsequent audits is based on experience already gained relative to the general accuracy of assessment payments. Generally this is not less than 15 percent of those responsible for payment nor less than 15 percent of the total assessments collected. Investigative audits are made whenever there is reason to believe violations have occurred.

Enforcement activities of the Bureau of

The dried figs shown above have been placed in a substandard diversion pool in accordance with a commodity marketing order program

Markets during 1955 consisted of investigation and handling of complaints of marketing regulation violations, checking of compliance with assessment provisions and collection of delinquent assessment payments. Most complaints of violation pertained to marketing of fresh peaches, pears and plums alleged to be substandard in grade or size and the marketing of deceptive lots of cling peaches for processing; 3,977 contacts were made to investigate or effect compliance. Delinquent assessments collected during 1955 amounted to $280,987.86. Civil penalties collected through court actions brought by the Office of the Attorney General amounted to $3,984.92.

The most important litigation during the year was that between the department and Paramount Citrus Association, relating to enforcement of provisions of the Marketing Order for Lemon Products. Paramount Citrus Association failed to comply with stabilization pool provisions of the marketing order. Accordingly, it was necessary for the department to file suit.

On August 11, 1955, the Superior Court of Los Angeles County held in favor of the State; civil penalties of $17,000 were levied and a permanent injunction issued against Paramount, which has appealed the case to the appellate court.

A decision favorable to the department also was given by the Superior Court of Fresno County which denied the petition of a handler of cantaloupes who sought to restrain the department from enforcing marketing regulations issued pursuant to the Marketing Order for California Cantaloupes. Action subsequently brought against the handler for violation of such regulations was preparatory to court trial scheduled for early in 1956.

Other cases litigated in 1955 pertained to the marketing of substandard or deceptive lots of fruit (cling peaches in most instances), violation of "red tag" regulations which govern the movement or disposition of substandard lots, and failure to pay assessments due. A total of 45 judgments was obtained during 1955 by the Office of the Attorney General in cases of this character, of which 24 had been satisfied in full by the end of the year.

Food Trade Surveys

At the request of the Processing Asparagus Advisory Board, the bureau conducted a food trade survey to determine factors preventing greater demand for California processed asparagus, develop new ideas for expanding this demand and obtain market information which would enable better understanding and evaluation of marketing conditions for California processing asparagus. Survey field work included personal interviews with 347 retailers, 247 brokers,

wholesalers, chain store executives and other distributors in 24 cities representing all regions of the United States.

The survey disclosed that producers and processors in competing asparagus-growing areas have improved quality of their output and acquired an increasing share of the domestic market. Relatively high retail prices for luxury styles of canned asparagus, predominant in the California pack, tend to inhibit consumer buying on impulse, the report showed. Moreover, consumer awareness appears to be on the wane for canned white asparagus, the most important single item of the California pack. The survey also disclosed good trade reception and increasing demand for asparagus in glass jars which at the time of the survey was being packed only by eastern producers. In the north central and northeastern regions, it was found that sales of frozen asparagus are increasing at the expense of canned asparagus. Consequently, to the extent that transportation costs and competitive pricing may prevent California from distributing frozen asparagus effectively in these regions, the California industry stands to suffer a reduction in the total demand for its product.

The published report of the survey, released October 31, 1955, included recommendations that the California asparagus industry (1) seek to increase its knowledge of production and production potentialities in competing areas; (2) educational and other promotional efforts be made to familiarize the trade and consumers with white asparagus; (3) attention be given to developing further the production of a utility economy-type pack in California; and (4) that the packing of asparagus in glass be tried experimentally. The published report was widely distributed; findings and recommendations of the survey were presented orally at numerous discussion meetings of asparagus growers and processors.

A food trade survey on processed boysenberries was conducted during 1955 at the request of the Bush Berry Advisory Board. The board desired information as soon as possible on ways to increase sales in California markets quickly enough to reduce boysenberry stocks substantially before the 1955 harvest season. The board also sought guidance for planning long-range promotion in out-of-state markets as well as in California. For this reason the survey included not only California markets but also 14 cities and metropolitan areas in all regions of the United States.

A bureau marketing economist is shown here making a food trade survey in a super market. Such surveys are carried on as a Research and Marketing Act project.

The findings and recommendations of the survey were made currently available to the industry through conferences and correspondence with the advisory board, its manager and its advertising agency. The board has made funds available for mailing the completed report, which will be printed early in 1956, to all California boysenberry growers and processors. The survey revealed a need for research on uses of processed boysenberries as well as for promotional activities to stimulate sales. For the western market, where boysenberries have become fairly well known, the survey report recommends publicity and advertising directed to the consuming public as well as to users and potential users of processed boysenberries in commercial production of food products. For the eastern market, which would be particularly important in years of heavy supply, recommendations include efforts to stimulate sales in the comparatively few existing outlets and development of new outlets.

General Marketing Service

The Bureau of Markets responds to many requests for information and assistance in connection with a wide variety of marketing problems and questions. Requests for this general marketing service are received from groups interested in the development

of new cooperative marketing associations and also from various commodity groups desiring explanation of the legislative authorizations available for establishing marketing order programs. The bureau also receives, by correspondence, telephone, telegraph and office visits, numerous requests from individuals and groups seeking information concerning marketing problems in general. Frequent requests also are received for participation by bureau personnel in meetings of industry groups. This general marketing service is financed by appropriations from the general funds of the State; however, when an industry formally requests the Director of Agriculture to begin the formal process of developing an industry self-help marketing program all costs incurred in accordance with such a request are borne by the industry itself.

Bureau of Market Enforcement

J. C. HARLAN, *Chief*

H. S. CANN, *Assistant Chief*

This agency was established in 1931, with the primary duty of enforcing the Produce Dealers Act as well as the Deciduous Fruit Dealers Act.

In 1933 the Agricultural Code was established by the Legislature. The Produce Dealers Act was amended and broadened to include dealers, brokers and agents as licensees. The Processors Law passed in 1935, contained provisions similar to those in the Produce Dealers Act, but also exercised jurisdiction over handlers of farm products for processing purposes. In 1945, amendments to these laws required the posting of surety bonds by dealers and processors.

The Produce Dealers Act and the Processors Law appear as Chapters 6 and 9, Division 6 of the Agricultural Code. Under these laws handlers of farm products must be licensed and bonded in order to engage in the business of commission merchant, dealer or processor. Brokers, cash buyers and agents also are required to obtain licenses.

Under the Produce Dealers Act the agency exercises jurisdiction over persons who handle farm products on consignment, or who purchase farm products in fresh form for distribution through wholesale channels. Practically all farm commodities are included under this act.

Under the Processors Law the agency supervises control over persons who purchase or handle farm products for the purpose of manufacture or processing, and who resell the finished product in dried, canned, extracted, fermented, distilled, frozen or other preserved or processed forms.

These statutes were enacted to protect persons engaged in the production of farm products. For many years controversies arising between producers and handlers have been adjusted by the bureau with a mini-

Twenty-nine-year Record

Tabulated below is a condensed summary of the activities of the Bureau of Market Enforcement in the administration of the regulatory statutes assigned to it for a 29-year period.

Year	Complaints closed	Licenses revoked	Licenses refused	Prosecutions	Hearings	Recoveries for growers
1927	23	0	0	0	0	$8,600.00
1928	203	0	0	3	2	8,200.00
1929	330	1	0	3	0	34,300.00
1930	241	0	3	3	4	62,600.00
1931	351	0	5	3	7	67,200.00
1932	477	6	3	10	25	67,100.00
1933	924	7	2	13	50	129,800.00
1934	832	53	3	50	80	106,400.00
1935	930	64	10	68	168	136,500.00
1936	1,170	50	16	79	150	151,400.00
1937	1,150	68	7	71	127	334,000.00
1938	1,475	67	13	59	252	519,300.00
1939	1,363	86	22	83	219	402,500.00
1940	1,188	86	14	55	251	476,600.00
1941	1,407	22	25	82	439	655,700.00
1942	873	17	228	36	300	320,500.00
1943	527	25	11	11	136	278,100.00
1944	411	11	9	15	114	357,500.00
1945	458	4	19	14	93	624,300.00
1946	555	11	68	21	128	455,600.00
1947	706	13	7	34	166	982,600.00
1948	834	21	8	56	212	761,400.00
1949	993	18	10	34	157	1,130,000.00
1950	773	15	12	42	135	925,400.00
1951	576	10	3	26	110	682,307.00
1952	644	20	10	30	126	534,886.00
1953	600	11	13	44	141	615,482.00
1954	676	21	15	61	137	817,639.00
1955	840	13	20	52	120	666,518.56

NOTE: Recoveries for growers stated in round figures. 1935-1944, inclusive, figures represent activities in enforcement of milk control laws, marketing orders and agreements and other measures now handled by Bureau of Milk Control and Bureau of Markets. 1945-1955, inclusive, figures reflect activities exclusively under Chapter 6, Division 6 (Produce Dealers Act), and Chapter 9, Division 6 (Processors Law), of Agricultural Code.

mum of expense to the parties involved; controls exercised by the bureau have made difficult the operation of unscrupulous handlers who not only attempt to defraud the producer but who also impose unfair competitive conditions on those licensees who operate legally.

Bureau work is predominantly in the field and involves investigation of complaints against licensees, as well as a continuing supervision of agricultural centers and points of shipping, harvesting or distribution, to insure that all persons active in handling farm products are properly licensed and bonded, and for the additional purpose of encouraging complete and general compliance with the statutes, with respect to payment and accounting for farm products purchased or handled on a consignment basis.

In general the statutes provide for the faithful and honest handling of farm products by licensees. Commission merchants are required to render true and proper accounts of sale and to make settlement thereon to the consignor. Dealers and processors are required to make payment and settlement with producers, in accordance with the terms of their contracts and as provided by statutory requirements.

Hearings are held on verified complaints filed by producers. When a violation of the statute involved has been determined, a licensee may be subjected to the suspension or revocation of license, or the imposition of probationary terms.

The Bureau of Market Enforcement maintains offices at Sacramento, San Francisco, Los Angeles and Fresno. Producers may file their complaints by telephone, telegram, letter or in person at any one of these offices.

During 1955 the bureau recovered for producers, under the Produce Dealers Act, $426,231.85, in which 781 producers participated. Under the Processors Law recoveries amounted to $240,286.71, in which 117 producers participated. The total amount involved under both statutes was $666,518.56, in which 898 producers participated.

DETAILS OF FUNCTIONAL ACTIVITIES

PRODUCE DEALERS

Summary of Complaints Handled—1955

Complaints open January 1, 1955		161
Complaints opened		714
Complaints reopened		24
Complaints closed		764
Amounts adjusted and recovered through the Bureau of Market Enforcement	$350,826.50	
Number of complainants participating in these recoveries		481
Amount recovered through bond actions	75,405.35	
Number of complainants participating in these recoveries		300
Total amount adjusted and recovered	$426,231.85	
Total number of complainants participating		781

RECOVERIES BY COUNTIES

Produce Dealers—1955

County	*Amount*	*Participants*
Alameda	$3,607.90 [1]	15
Butte	4,421.09 [1]	1
Colusa	1,800.00 [1]	1
	8.77 [2]	1
Contra Costa	1,260.87 [1]	4
	87.39 [2]	2
El Dorado	232.79 [1]	1
Fresno	32,106.89 [1]	36
	6,224.91 [2]	26
Glenn	454.40 [1]	2
	187.60 [2]	3
Humboldt	100.00 [1]	1
Imperial	31,687.44 [1]	29
	7,738.91 [2]	29
Inyo	465.00 [1]	2
Kern	15,526.30 [1]	28
	2,673.07 [2]	4
Kings	852.34 [1]	3
	115.98 [2]	1
Lassen	409.00 [1]	1
Los Angeles	24,137.93 [1]	54
	8,905.41 [2]	22
Madera	3,236.50 [1]	3
	698.84 [2]	7
Mendocino	139.00 [1]	1
Merced	2,094.91 [1]	10
	587.24 [2]	6
Monterey	17,676.37 [1]	17
	2,019.16 [2]	4
Nevada	13.06 [2]	1
Orange	4,267.51 [1]	8
	817.26 [2]	2
Placer	2,768.40 [1]	1
	2,013.20 [2]	2
Plumas	994.96 [1]	2
Riverside	13,942.62 [1]	24
	11,250.25 [2]	38
Sacramento	1,530.55 [1]	2
	723.03 [2]	5
San Benito	415.86 [1]	3
	1,116.54 [2]	7
San Bernardino	3,731.57 [1]	12
	1,545.97 [2]	5
San Diego	26,736.01 [1]	12
	1,989.95 [2]	4
San Francisco	8,818.27 [1]	13
San Joaquin	13,652.19 [1]	32
	770.42 [2]	8
San Luis Obispo	489.68 [2]	4
San Mateo	17,256.78 [1]	39
	3,225.79 [2]	4
Santa Barbara	5,228.07 [1]	4
	1,114.70 [2]	1

Santa Clara	29,355.22 [1]	32
	5,851.53 [2]	45
Santa Cruz	5,204.16 [1]	14
	374.50 [2]	5
Shasta	4.96 [2]	1
Siskiyou	7,533.13 [1]	4
Solano	228.04 [1]	1
	1,044.78 [2]	2
Sonoma	8,052.46 [1]	12
	105.63 [2]	3
Stanislaus	2,126.86 [1]	11
	1,668.37 [2]	10
Sutter	150.00 [1]	2
Tehama	17,624.95 [1]	14
	600.21 [2]	2
Tulare	8,646.18 [1]	19
	8,314.29 [2]	24
Tuolumne	15,658.00 [1]	2
	761.72 [2]	2
Ventura	6,576.84 [1]	3
	114.42 [2]	1
Yolo	9,855.14 [1]	4
	2,247.81 [2]	19
Yuba	225.00 [1]	1
Out-of-state	39.00 [1]	1
Total through Bureau of Market Enforcement	$350,826.50	481
Total Through Bond Recovery	75,405.35	300
	$426,231.85	781

[1] Through Bureau of Market Enforcement.
[2] Through bond recovery.

ACTIONS AGAINST LICENSES

Total number of licenses canceled or revoked	13
Total number of licenses suspended	6
Total number of licenses refused	20
Total number of licenses reinstated	0

PROSECUTIONS AND RESULTS—1955

Total number of prosecutions initiated	51
Jail sentences served	6
Total jail sentences suspended or probation granted	28
Fines assessed (paid)	14
Fines suspended	3
Cases pending	10
Cases dismissed or withdrawn	28
Department hearings	117

PROCESSORS LAW

Summary of Complaints Handled—1955

Complaints open January 1, 1955		14
Complaints opened		79
Complaints reopened		3
Complaints closed		76
Amount adjusted and recovered through the Bureau of Market Enforcement	$223,699.96	
Number of complainants participating in these recoveries		88
Amount recovered through bond actions	16,586.75	
Number of complainants participating in these recoveries		29
Total amount adjusted and recovered	$240,286.71	
Total number of complainants participating		117

RECOVERIES BY COUNTIES

Processors—1955

County	*Amount*	*Participants*
Alameda	$149.60 [1]	1
Colusa	295.58 [1]	2
Contra Costa	5,309.30 [1]	1
Fresno	30,226.52 [1]	4
Kern	84,114.94 [1]	3
Los Angeles	930.14 [1]	2
Merced	8,907.06 [1]	3
Monterey	9,000.00 [1]	2
Riverside	3,618.52 [1]	16
	2,606.97 [2]	4
San Benito	1,506.32 [1]	2
	2,452.05 [2]	2
San Diego	241.98 [1]	1
	3,865.39 [2]	9
San Francisco	2,984.00 [1]	1
San Joaquin	7,505.25 [1]	1
Santa Barbara	474.06 [1]	1
Santa Clara	15,037.03 [1]	24
	2,132.90 [2]	2
Santa Cruz	3,691.10 [1]	1
	529.44 [2]	5
Sonoma	4,616.62 [1]	13
Stanislaus	35,455.86 [1]	4
Sutter	1,261.13 [1]	4
Tulare	2,500.00 [1]	1
Ventura	5,874.95 [1]	1
	5,000.00 [2]	7
Total through Bureau of Market Enforcement	$223,699.96	88
Total through Bond Recovery	16,586.75	29
	$240,286.71	117

[1] Through Bureau of Market Enforcement.
[2] Through bond recovery.

ACTIONS AGAINST LICENSES

Total number of licenses canceled or revoked	0
Total number of licenses suspended	0
Total number of licenses refused	0
Total number of licenses reinstated	0

PROSECUTIONS AND RESULTS—1955

Total number of prosecutions initiated	1
Jail sentences served	0
Total jail sentences suspended or probation granted	0
Fines assessed (paid)	0
Fines suspended	0
Cases pending	1
Cases dismissed or withdrawn	0
Department hearings	3

LICENSES ISSUED, DETAIL OF ACTION ON LICENSES AND ON PROSECUTIONS

Summary of All Activities

Complaints open January 1, 1955		175
Complaints opened		793
Complaints reopened		27
Complaints closed		840
Amounts adjusted and recovered	$574,526.46	
Number of complainants participating in these recoveries		569
Amount recovered through bond activities	91,992.10	
Number of claimants to these recoveries		329
Total adjustments	$666,518.56	
Total number of complainants participating in adjustments		898

PROSECUTIONS AND RESULTS

Total number of prosecutions initiated	52
Total jail sentences served	6
Total jail sentences suspended or probation granted	28
Fines assessed (paid)	14
Fines suspended	3
Cases pending	11
Cases dismissed or withdrawn	28
Department hearings	120

LICENSES ISSUED IN 1955

Produce Dealers Act		12,236
Dealers	4,398	
Brokers	1,493	
Commission merchant	1,067	
Cash buyer	826	
Agents	4,452	
Processors Law		2,406
Processor	657	
Agents	1,749	

CANCELLATIONS, REVOCATIONS, SUSPENSIONS, REFUSALS AND REINSTATEMENTS

	Produce Dealers	*Processors*
Canceled or revoked	13	0
Suspended	6	0
Refused	20	0
Reinstated	0	0

COURT ACTIONS

Produce Dealers Act

CASES PENDING

A. A. Brock v. *General Casualty Company:* Suit was filed in Superior Court, County of Tulare, No. 45266, in April, 1954, in behalf of producer-creditors of Sandilands Fruit Company and/or Allen & Sandilands. Trial in this matter is now set for February 15, 1956.

A. A. Brock v. *Glens Falls Indemnity Company:* Suit was filed in Municipal Court, City and County of Los Angeles, No. 123281, on September 4, 1953, in behalf of producer-creditors of Orange Hill Groves. After trial, judgment was rendered in favor of defendant and an appeal taken on September 29, 1954. On December 13, 1954, judgment of the trial court was reversed, and on December 30, 1954, an order was issued transferring the case to the Superior Court, City and County of Los Angeles, No. 639549. The Superior Court has transferred this matter for rehearing to Department 2, Municipal Court, Riverside Judicial District, Riverside.

CASES CLOSED

A. A. Brock v. *Fidelity and Deposit Company of Maryland:* Suit was filed in Municipal Court, City and County of San Francisco, during 1953, in behalf of a producer-creditor of Claude E. Jackson. Compromise of this claim was made, and on June 15, 1955, judgment was issued in the Municipal Court, City and County of San Francisco, whereby $600 was ordered to be paid by defendant. This amount was recovered and transmitted to the producer-creditor in whose behalf the claim had been filed by the Director of Agriculture.

A. A. Brock v. *Fireman's Fund Indemnity Company:* Suit was filed in Superior Court, City and County of Los Angeles, in 1952 in behalf of the producer-creditors of Calvin E. Sides, dba Coachella Valley Produce Terminal. On March 22, 1955, judgment was rendered in favor of the Director of Agriculture for the full amount of the claim as filed, and including an additional $1,700 in interest.

W. C. Jacobsen v. *M. J. Yoder, A. C. Doughty, and Phoenix Indemnity Company:* In August, 1955, suit was filed in Municipal Court, Riverside Judicial District, County of Riverside, against A. C. Doughty and Phoenix Indemnity Company by M. J. Yoder, a producer-creditor of Doughty. Demand in behalf of several producer-creditors had previously been made by the Director of Agriculture on Phoenix Indemnity Company, surety on Doughty's dealer's bond. On August 26, 1955, Phoenix Indemnity Company moved to substitute the Director of Agriculture as defendant in this action. On September 16, 1955, a complaint in intervention was filed by the Director of Agriculture. On September 23, 1955, trial in the matter was had, and thereafter a stipulated judgment was entered ordering payment to the Director of Agriculture of the penal sum of the dealer's bond. This amount was thereupon distributed to all producer-creditors of A. C. Doughty.

Processors Law

CASES PENDING

Puccinelli v. *Jacobsen:* On November 15, 1954, suit was filed in Superior Court, Stanislaus County, No. 54111, petitioning for a writ of mandate and order to stay the operation of an administrative order and decision revoking the license of Puccinelli Packing Company. The alternative writ of mandate and order staying the operation of the administrative order and decision was issued at that time. Re-

spondent's answer was filed on December 13, 1954, and on December 17, 1954, a stipulation was filed providing for a full review by the court of the complete record of the proceeding before the department. Petitioner's brief was filed January 7, 1955, and respondent's reply brief was filed February 7, 1955. On May 31, 1955, a memorandum decision was issued by the court supporting complainant.

CASES CLOSED

A. A. Brock v. *Western National Indemnity Company:* Suit was filed in Superior Court, City and County of San Francisco, No. 418976, in July, 1952, in behalf of producer-creditors of Clara-Val Packing Company. Judgment was rendered in favor of plaintiff on July 13, 1953. Subsequently defendant filed a motion for rehearing which was denied on November 16, 1953. Thereafter defendant filed an appeal with the First Appellate Court, District Court of Appeals. In April, 1955, appellate court reversed the judgment of the superior court.

LICENSES CANCELED, REVOKED, SUSPENDED, DENIED FOR CAUSE OR REINSTATED—1955

Produce Dealers Act

Appel & Sons; Solvang: Dealer's and broker's licenses suspended effective July 8, 1955, to February 8, 1956, due to insolvency of respondent.

Apple Hut (John F. Kusanovich); Watsonville: Application for cash buyer's license denied June 23, 1955. Previous violation of the Agricultural Code.

Auster-Tarrish Co. (Auster Co. of Calif., Inc., and Jos. C. Tarrish); Los Angeles: Dealer's, broker's and commission merchant's licenses revoked September 16, 1955, for violation of the Agricultural Code.

Barbe, Forest W.; Chula Vista: Application for agent's license to represent C. Dami & Sons refused and denied October 18, 1955. Failure to satisfy the director of his character, responsibility and good faith.

Barnett, Sam D.; El Centro: Application for agent's license to represent Nat Spector denied June 3, 1955. Previous violation of the Agricultural Code.

Blase Bros.; San Jose: Dealer's license revoked April 13, 1955. Violation of the Agricultural Code.

Capitol Hay & Grain Co. (Joe Louis); Suisun: Dealer's license revoked January 24, 1955, 11.30 a.m. Violation of the Agricultural Code.

Cinelli & Co.; San Francisco: Dealer's, broker's and commission merchant's licenses revoked February 26, 1955, at 12.01 a.m. Violation of the Agricultural Code.

Cinelli & Co., Inc.; San Francisco: Commission merchant's and broker's licenses refused and denied March 3, 1955. Violation of the Agricultural Code.

Cohen, Jake; Bakersfield: Dealer's license revoked October 25, 1955, at 2.45 p.m., for violation of the Agricultural Code.

Cripe, J. O.; Modesto: Cash buyer's license revoked April 7, 1955, at 11 a.m., for violation of the Agricultural Code.

Cutler Fruit Co., Inc.; Cutler: Dealer's, broker's and commission merchant's licenses revoked November 15, 1955, at 5 p.m., for violation of the Agricultural Code and insolvency.

Esposito, Joseph R.; San Pedro: Application for broker's license denied December 22, 1955, for failure to satisfy the director of his character, responsibility and good faith.

Esposito, Ralph A., and Joseph R.; San Pedro: Application for broker's license denied August 24, 1955. Previous violation of the Agricultural Code. Applicant failed to make satisfactory showing of character, responsibility and good faith.

Fales, G. W.; Susanville: Application for dealer's license refused and denied September 20, 1955, for violation of the Agricultural Code, and applicant's failure to make the necessary showing of character, responsibility and good faith.

Firebaugh Hay Market (Wm. Elliott); Petaluma: Dealer's and broker's licenses suspended April 4, 1955, to July 31, 1955, due to insolvency.

Fresno Hay Market & Dos Palos Hay Market (Merrill J. Nikkel): Dealer's and broker's licenses revoked December 7, 1955, at 3 p.m.

Graham, J. W.; Fresno: Application for dealer's license denied May 6, 1955. Previous violation of the Agricultural Code.

Hurd's Poultry Farm (Meredith D. Hurd); Woodland: Dealer's license suspended January 14, 1955, to April 29, 1955. Violation of the Agricultural Code.

Ilse, Lawrence B.; Sunnyvale: Application for dealer's license denied August 11, 1955, for the reason that testimony revealed that the business actually belonged to Joseph and Bertha Pastore, against whom there is a previous violation of the Agricultural Code.

Khouri, Habib W.; Dinuba: Applications for dealer's and commission merchant's licenses refused and denied September 27, 1955. Failure to make the necessary showing of character, responsibility and good faith as required by the Agricultural Code.

Khouri, William H.; Reedley: Cash buyer's and broker's licenses denied June 6, 1955. Previous violation of the Agricultural Code and failure to satisfy the director of his character, responsibility and good faith.

Khouri, William Harry; Reedley: Application for agent's license to represent Habib W. Khouri refused and denied September 27, 1955. Previous violation of the Agricultural Code, and failure to satisfy the director of his character, responsibility and good faith.

Landseadal, Gustave A.; Dinuba: Application for dealer's license refused and denied August 3, 1955. Previous violation of the Agricultural Code.

Lewin's Poultry (Harold V. Lewin); Pomona: Cash buyer's license revoked May 20, 1955. Violation of the Agricultural Code.

Lopes, J. N.; San Jose: Dealer's license revoked December 28, 1954, at 12 o'clock m. Violation of the Agricultural Code.

Monroy, E. A.; San Marino: Application for agent's license to represent Twin Wholesale Flower Shippers refused and denied November 18, 1955. Previous violation of the Agricultural Code and failure to satisfy the director of his character, responsibility and good faith.

Owens, T. H.; Hanford: Dealer's license suspended for the period November 28, 1955, at 12.01 a.m., to expiration date of license, namely, July 24, 1956. Violation of the Agricultural Code.

Pacific Marketing Corp., Salinas: Application for renewal of dealer's license denied June 7, 1955, because of applicant's failure to make proper showing of character, responsibility and good faith. Petition to set aside order denying the renewal application for dealer's license denied August 12, 1955.

Pastore's Poultry (Joseph J. and Bertha Pastore); Sunnyvale: Cash buyer's license revoked June 24, 1955. Violation of the Agricultural Code.

Rossi, Albert; Manteca: Application for agent's license to represent Fruit & Vegetable Distributing Co., refused and denied September 1, 1955, for violation of the Agricultural Code, and failure to satisfy the director of his character, responsibility and good faith.

Scarbrough, Elwood; Salinas: Applications for broker's and commission merchant's licenses denied May 6, 1955, because of previous violation of the Agricultural Code.

Scarbrough, Warren Elwood; Watsonville: Dealer's license suspended from November 16, 1955, until the expiration date, namely, April 11, 1956. Violation of the Agricultural Code and insolvency.

Ship Shape Packing Co.; Salinas: Dealer's, broker's and commission merchant's licenses revoked March 16, 1955, at 12 o'clock p.m. Violation of the Agricultural Code.

Sigler, Edd C.; Artesia: Application for agent's license to represent Frank Ruggieri denied June 28, 1955. Failure to satisfy the director of his character, responsibility and good faith.

Simmons Dressing Plant (Guy Wallace Simmons); Baldwin Park: Dealer's license suspended from June 4, 1955, to November 30, 1955. Violation of the Agricultural Code.

Smith, Robert Harry; Paradise: Cash buyer's license revoked September 13, 1955. Violation of the Agricultural Code.

Westerfield, Arthur H.; Coachella: Application for broker's license denied March 9, 1955. Violation of the Agricultural Code.

Wruck, Henry; San Diego: Cash buyer's license denied April 14, 1955. Failure to satisfy the director of his character and responsibility.

Bureau of Market News

GEORGE K. YORK, *Chief*
MAX K. JOHNSON, *Assistant Chief*

The Bureau of Market News is entirely a service agency. The function of the bureau is to collect and disseminate market information for use by all segments of the agricultural industry, as an aid in intelligent marketing of products of the farm. The work involves primarily the determination and publication of current prices brought by farm produce, and of facts concerning movement, receipts, stocks, attitudes, sales and other supply and demand factors affecting prices.

The work of the bureau is carried on under a cooperative agreement between the California Department of Agriculture and the United States Department of Agriculture. This cooperative agreement dates back to 1922 on a limited basis, and to 1928 when a comprehensive market news program was established on a state-wide basis. Cooperative market news reporting is carried on under the operational title, Federal-State Market News Service.

Both the State and Federal Governments contribute personnel and services for market news reporting on an approximately equal basis. It is significant that market news reporting is very highly developed in California in relation to that elsewhere. Such high development reflects producer and marketer needs arising from the wide diversity of production and the great distances from the main markets for many commodities.

The collection and dissemination of market news is performed by market reporters located in the two major terminal market areas in California and virtually all other major terminal markets of the nation; and in major producing areas in California and competitive producing areas of the remainder of the nation.

The collection of information is accomplished by all practical means. Price and market condition information is largely obtained from buyers and sellers by personal or telephone contact, or by observation of actual trading. Supply and other information is obtained by all media of communication. Additionally, the collection of information in California, for which centralized marketing areas do not exist, is partly achieved by extensive field travel.

Dissemination of information also is accomplished by all practical means. The mainstay of dissemination, over the years, has been mimeographed reports. Regularly 135 series of daily, semiweekly, weekly, monthly, annual or seasonal reports are issued covering virtually the entire range of California's crop and livestock products. Mailings of mimeographed reports, which are sent only to persons specifically requesting them, totaled approximately 7,500,000 pieces from California Market News offices during 1955.

Dissemination also is partly accomplished by personal and telephone contact, recorded phone messages, commercial telegrams, bulletin boards, loud speaker systems, counter wires, press services, newspapers and radio and television broadcasting. Indicative of the volume of information disseminated by telephone is the fact that over 300 phone calls per day have been handled by a single office. Dissemination by television although relatively new has gained in popularity, as experience in methods of presentation also developed.

Since the value of market information varies inversely with its timeliness, rapid communications are essential in the collection and dissemination of market news. To accomplish rapid communication, the United States Department of Agriculture maintains a leased wire system of more than 11,000 miles, connecting most major producing areas and virtually all major terminal markets of the Nation. To supplement this leased wire system, the California Department of Agriculture has maintained a radiotelegraph system connecting the two major terminal market areas and seven major producing areas of California.

Although radio frequencies assigned to the Federal-State Market News Service in California have been in constant use since 1928, authority for such use was cancelled

BUREAU OF MARKET NEWS COMMUNICATIONS NETWORK

The 20 offices of the Federal-State Market News Service in California are located at strategic producing areas and terminal market points. Efficient communications facilities between California and other terminal and producing area markets of the Nation are maintained for rapid dissemination of information.

by the Federal Communications Commission late in 1955. As a substitute, plans have been made and a contract let to connect all California offices by leased land lines.

State-wide Activities

The work of the 20 separate offices of the Federal-State Market News Service is divided into five main categories: fresh fruits and vegetables; dairy and poultry products; livestock, meats and wool; hay, grain and feeds; and a miscellaneous group including dried fruits, wines and grapes for wine, honey and foreign reports. The offices are located from the Imperial Valley and Los Angeles, in the south, to Sacramento and San Francisco, in the north.

Fresh fruits and vegetables are reported from Los Angeles, San Francisco, Salinas, Santa Maria, Imperial Valley, Bakersfield, Fresno, Stockton, Lodi and Sacramento; dairy and poultry products from Los Angeles, San Francisco and Fresno; livestock, meats and wool from Los Angeles, San Francisco, South San Francisco, Stockton and Visalia; hay, grain and feeds from Los Angeles, San Francisco and Sacramento; and the miscellaneous group of commodities from Sacramento, San Francisco, Fresno, Los Angeles and Salinas.

Operations of the Federal-State Market News Service continued, generally, the same as in previous years except for modifications necessary to meet changing marketing methods or conditions. Changes of chief interest included opening of a livestock office at Visalia, in July, to cover local marketing and direct trading in the Southern San Joaquin Valley area; realignment of the work of the Stockton livestock office to include regular covering of the Dixon livestock auctions; addition of ranch price quotations for chicken fryers in the Los Angeles area; discontinuance of formal ranch price quotations for rabbits in Southern California; addition of a consolidated report of rail and truck receipts of major fruits and vegetables as a national index of supplies; quotation of the Perris Valley-Chino f.o.b market for potatoes; elaboration of f.o.b. price reporting of fresh plums; expansion of the work of the new fruit and vegetable office at Stockton, particularly to cover f.o.b. trading on tomatoes, celery, potatoes, onions, corn and other locally important produce; and participation by the Los Angeles fruit and vegetable office in a national study of the rate of apple movement into consumption.

Further expansion in trading at prices reported by the Market News Service or based on such quotations indicated increased buyer and seller reliance on market news reports, but at the same time made the determination of market prices more difficult through reducing the volume of goods available for customary trading. A continuing trend of consolidation of independent wineries into large organizations and increased cooperative selling of wines have tended to increase the difficulty of adequately reporting this important commodity. Complications largely due to the lack of standard quality differentiations precluded the publication of f.o.b. prices for fresh market asparagus in this first year of operating the Stockton fruit and vegetable office.

Major market developments and highlights are presented briefly in the following paragraphs. For a fuller report covering marketing of California's 1955 crop and livestock products, write outlining your needs to Federal-State Market News Service, 1220 N Street, Sacramento 14, California.

MARKET HIGHLIGHTS

Price declines more than offset price advances nationally during 1955, continuing the downward price trend which began in 1952. The national index of prices received by farmers for agricultural products averaged 237, down 12 points from 1954. The mid-December average of 223 was 16 points below December, 1954, and the lowest since June, 1946. During the first half of 1955, the index of prices received by farmers fluctuated up and down within a narrow range, but during the last half the index declined nearly every month.

Despite slight firming in prices of some farm products in the closing weeks of 1955, prices at mid-December for both crops and livestock products averaged 7 percent below December, 1954. Less than half of this decline was passed on to consumers, due to increased marketing charges. Price declines during 1955 were large for hogs; and substantial for some feed grains, oilseeds, potatoes and cattle. Price increases compared with December, 1954, were noted in eggs, other poultry products, commercial vegetables and tobacco.

The drop in farm product prices during 1955 reflected the 3 percent rise in farm output to a record high, and a large carryover of several major crops. Crop production was up 4 percent and the volume of livestock products up 2½ percent over 1954. Consumer income and employment rose during 1955, maintaining demand at a high level.

Dairy and Poultry Products

California markets for dairy products continued to expand as the State gained further in population. This expansion was reflected in record high receipts of butter and cheese at Los Angeles and San Francisco. Combined receipts at these two terminal markets totaled 99½ million pounds of butter and 62½ million pounds of cheese, increases of 20 million and three million pounds, respectively, over 1954.

Although the increase in butter receipts included considerable government-owned cars, it is apparent that civilian consumption also registered a substantial increase. The volume of butter moving to retail outlets increased 10 percent over 1954 at San Francisco, and 13½ percent at Los Angeles.

Although still far below the average of 16.9 pounds from 1935 to 1939, per capita consumption of butter for the country as a whole increased 0.2 pounds over 1954 to 9.2 pounds in 1955. Per capita consumption of oleomargarine decreased 0.1 pounds to 8.3 pounds. Per capita consumption of cheese, however, also decreased 0.1 pounds nationally to 7.7 pounds in 1955.

Ice cream production increased 5½ percent over 1954 nationally, and 3½ percent in California. National per capita consumption increased 2.0 pounds to 48.6 pounds. Production of sherbet also increased, gaining 1 percent nationally.

Despite the increases in usage, dairy products continued in surplus production nationally. Market prices of major products in California to a large extent remained dependent on governmental support prices, mandatory under federal law; or on prices set under state laws and regulations.

California prices for turkeys, chickens and eggs averaged higher than in 1954. Feed prices were slightly lower so that generally 1955 was a more profitable year for the producers. Production of these commodities was near record levels, and the total value about 10 percent above 1954.

Turkey production increased 1 percent in California to the second largest crop on record, though production nationally was down 4 percent from 1954. California remained the leading turkey producing state. The trend of the past several years continued away from the light breed turkeys, and heavy breeds made up nearly 92 percent of the 1955 crop.

Chicken fryer production dropped 2 percent but was the second largest on record. Production nationally was at a record level. Heavy shipments of processed fryers from other states were very competitive with locally produced birds. Ready-to-cook ice-packed fryers from Arkansas, Texas, Alabama, Georgia, Mississippi and other eastern producing areas were shipped into Los Angeles in ever increasing volume. Most of the large wholesale fryer processors in the Los Angeles area now purchase their live fryers directly from producers rather than through hucksters. A very large share of the poultry marketed to retailers now is processed and ready-to-cook.

Egg production in California and nationally was at an all time high. Per capita consumption also increased to a record level. This, along with the increase in California population, made for improved demand which raised 1955 prices over the previous year and made it a more profitable year for producers. In contrast with 1954 prices, which averaged lower the last half of the year, 1955 prices returned to a more normal pattern of higher levels in the fall than in the spring.

Livestock and Meats

The year 1955 was one of abundant meat supplies in California where cattle slaughter was 6 percent larger than 1954, calf slaughter 8 percent larger, hog slaughter 17 percent larger, and sheep slaughter 6 percent larger. Cattle on feed in California, January 1, 1955, were 33 percent greater than January 1, 1954; the number on January 1, 1956, was up another 5 percent from a year earlier. The pig crop was 5 percent larger than in 1954. The number of lambs on feed January 1, 1955, was 18 percent larger than a year earlier, and on January 1, 1956, increased another 3 percent from January 1, 1955.

Livestock prices declined sharply during the year. Fed steers peaked at $25 early in January but dropped to $20. This drop of 20 percent compared with a decline in beef

of 15 percent. Best heifers declined from $22 to $18.50. The top price on hogs at South San Francisco dropped from $19.50 to $13 or nearly 35 percent. Pork loins, 8-12 pounds, declined 13 percent. The top on lambs at South San Francisco dropped from $20.75 to $19.50 or 6 percent. Choice and prime lamb carcasses dropped only three percent. With livestock numbers still rather large on January 1, 1956, indications were that meat supplies would continue abundant.

Hay, Grains, and Feeds

California barley markets weakened in 1955, influenced by burdensome supplies, declines in other grains and reduced government price support levels. Price declines, together with more favorable feeding ratios and less satisfactory pasture and range conditions, tended to stimulate usage. While usage of California barley by West Coast maltsters was the smallest in 13 years, other items of distribution were not greatly different from a year earlier. Total distribution during the first seven months of the 1955 crop marketing season was the largest of record. Prices, however, did not fall as far below support prices as a year earlier, and growers pledged less under support.

Corn and milo prices averaged below 1954 except for a brief period at midsummer. Acreage and production of corn again increased sharply in California to new record highs, as growers substituted this crop for others. Heavy local supplies were traded actively in California terminal markets in the several months following harvest. The almost complete dominance of California corn during its marketing season was one of the outstanding features of grain trading at Los Angeles. Milo acreage and production also increased over 1954. Wheat and oat prices were near 1954 levels most of the year but averaged moderately lower the last two months.

The general trend of feedstuffs prices was downward during 1955, although short-run strength developed in late August and September when mixed feed manufacturers and users bought nearby shipments to replenish stocks which had run low. The national index of wholesale prices dropped in November to the lowest point in almost 10 years.

Trading in California, generally rather uneventful, was moderately heavy early in the season, especially for deferred shipments. Anticipated seasonal price advances did not develop as expected. Buyers were very cautious during the remainder of the season, and trading was confined largely to offerings for nearby shipment.

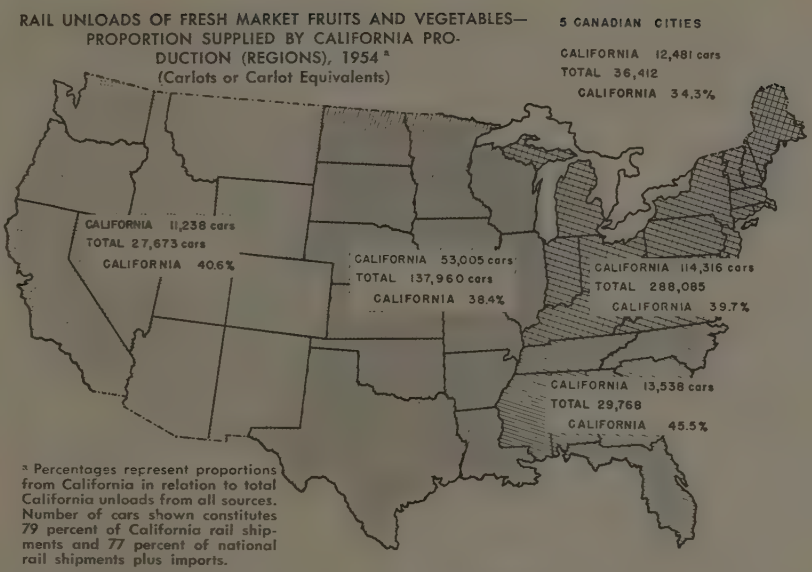
Prices nationally at the close of 1955 averaged about 15 percent below those at the close of 1954.

Prices in California closed the year lower than a year earlier on soybean meal, meat scraps, linseed meal, wheat millfeeds, copra meal and cottonseed meal; but higher on beet pulp, orange pulp, alfalfa meal and fish meal.

California rice markets weakened during the 1954-55 marketing season, influenced by price declines in Southern and foreign markets. Local supplies were slightly smaller than the record amounts a year earlier, but prices averaged the lowest in five years. Distribution continued at a relatively high level. Larger shipments to domestic markets and island territories tended to offset decreased export movement. Prices showed further weakening early in the 1955 crop marketing season.

Hop markets strengthened late in 1955 influenced by sharply smaller supplies than in recent years. United States hop growers reduced the 1955 acreage because of dissatisfaction with declining prices which at the beginning of 1955 had reached the lowest levels in 18 years. Advancing prices of the late fall months brought prices at the close of 1955 to nearly three times the levels of a year earlier.

Price trends on dry beans, during the 1955 crop period September to December, were downward for all California varieties except baby limas, red kidneys and cranberrys. Demand was generally slow with trading principally on a hand-to-mouth basis. The smallest production of baby limas since 1932 gave strength to that market. Prices advanced $1.50 per 100 shortly after harvest and were around $3 above support prices. The commercial red kidney market was bolstered by unfavorable harvest weather in New York, which reduced the quantity and quality of the crop there. Large limas were firm. San Joaquin Valley limas were of better quality than usual and met good demand early in the season when foggy weather hampered harvesting in Southern California. Blackeyes were generally weak reflecting the largest crop since 1948; prices were the lowest since that season. Small whites were weak with production the largest since 1941. Pinks were in moderate



supply and demand and held generally steady.

Demand for alfalfa hay was unusually broad from dairymen and other livestock feeders in Southern California. Despite record acreages, users provided a consistently ready outlet for marketings at Los Angeles at prices averaging substantially above 1954. Users' anxiety regarding possible depredation of the yellow spotted aphid provided a very important stimulus to active buyer interest. This concern was exploited by producers and handlers. Reflecting the active demand and broad trading, marketings at Los Angeles were of record volume.

Marketing in Central and Northern California was on a normal, orderly basis. Prices followed a generally firm trend and growers considered levels satisfactory, reflecting favorable supply and demand relationships. Supplies were slightly smaller than the previous year, and there were more cattle to feed. The tendency of southern Sacramento Valley producers to receive higher prices than usual in relation to other districts was a feature of the season. This tendency resulted principally from very firm grower asking prices and holding for those prices. Although the spotted alfalfa aphid spread through Central and Northern California during the year, it appeared to have little measurable market effect.

Fresh Fruits and Vegetables

California rail shipments of fresh fruits and vegetables to out-of-state markets continued around the high level of the previous few years. They totaled 276,784 carloads, or 4,039 more than in 1954 and 3,649 less than the previous five-year average. United States rail shipments, on the other hand, again decreased from the previous year to only 676,434 carloads, the smallest number in more than 35 years.

California originated 41 percent of the total United States rail shipments, which equaled the proportion in 1953. We originated 99 percent of the grapes, 71 percent of the berries, 57 percent of the citrus fruits, 36 percent of the vegetables, 35 percent of the melons, and 27 percent of the rail shipments of deciduous fruits.

The volume of rail shipments of most commodities from California showed little variation from the usual amounts. Celery was an exception, with the heaviest shipments of record and nearly double the number of cars 10 years ago. Volumes of lettuce and potatoes were near peak amounts. Orange shipments, although up slightly from 1954, were among the smallest of record. Total grape shipments were about average, but black juice grape movement declined to the smallest amount of 25-year

records and only a fraction of the prohibition era movement. Thompson Seedless grape movement was the largest of record. Freestone peach movement also was the largest of the 25-year records as a result of losses from freezing in southern states. Volume of pears was lighter than in most years. Shipments of nectarines, although again small compared with other fruits, continued to increase as our production gained.

California outbound truck shipments of fresh market produce continued to increase; such shipments totaled the equivalent of 67,041 carloads, or 6,105 more than in 1954, nearly double the 35,003 carloads of 1950. The 1955 volume represented about 20 percent of the total outbound rail and truck movement from California. Increases over 1954 were general in all types of commodities except citrus fruits. Inbound truck shipments were 22,115 carlot equivalents, or slightly less than the previous year. Volume was equivalent to about one-third of the outbound movement.

Unloads of fresh fruits and vegetables at Los Angeles during 1955 totaled 119,846 carloads, another record high. This market continued to rank second in the United States. New York was first with 168,158 carloads, Chicago third with 75,987, and Philadelphia fourth with 66,837.

Truck and rail receipts increased over 1954 at Los Angeles, but boat and airborne receipts dropped. California supplied 80.5 percent of the total there and trucks brought in 87.6 percent. Greatest increases over 1954 occurred in avocados, lettuce, and apples. Greatest decreases occurred in bananas, tomatoes, freestone peaches, and grapefruit. Potatoes were the leading commodity, followed by tomatoes, lettuce and celery. Containers and packages continued to change. Use of cartons and consumer packages continued to increase.

The Los Angeles market is an important redistribution center. It is estimated that at least 25 percent of the total fresh fruits and vegetables unloaded on the market are shipped to other markets within California and other nearby states.

Receipts of fresh fruits and vegetables at San Francisco were the lightest in the 25 years during which complete records have been tabulated. Items with record light volumes included asparagus, cauliflower, juice grapes, oranges, peaches and potatoes. Only romaine and edible pod peas reached new record heavy volume. The trend continued toward the use of cartons as containers, and there was a further increase in the volume of produce packaged in consumer-type containers.

Receipts at Oakland were slightly less than in 1954, but otherwise the heaviest of 14-year records. Items which were the heaviest on record were avocados, corn, table grapes, lettuce, dry onions, plums, romaine, squash and tomatoes. No record lows were established, but lemons, oranges, peas and spinach approached previous lows.

The 1955 Delta district asparagus season was featured by high average returns to growers and shippers, and a near record canned pack. Shipments of asparagus for the fresh market were below normal. The Stockton district celery season was one of generally slow demand and near normal production, costs, and f.o.b. prices. Shipments were about the same as in 1954, though acreage was reduced. The midsummer fresh corn season was featured by prices consistently below cost and by very slow movement. A considerable part of the planted acreage was abandoned because of market conditions. Delta district onions and Long White potatoes also were faced with a slow demand and f.o.b. prices that were near or below costs. The Northern San Joaquin-Southern Sacramento Valley tomato season was one of higher than usual f.o.b. returns and heavy rail shipments. Truck shipments were believed to have been considerably reduced from the previous season. Yields in the district were below normal due to adverse weather conditions during the growing season.

The Salinas-Watsonville area vegetable season was highlighted by unusual marketing conditions. With light home-grown offerings of all greens in eastern terminal markets, demand and price for most western vegetables was good during the summer months. Salinas-Watsonville lettuce, carrots and celery participated in this profitable situation. For lettuce this was a distinct contrast to the prolonged low price levels during the spring deal.

The year at Salinas was featured by a substantial decrease in carrot acreage and a marked increase in celery production. Another important development was the continued shift in usage of different types of containers. Usage of fiberboard cartons for lettuce increased to 84 percent of the total shipments. Volume of topped carrots packed

DISTRIBUTION OF CALIFORNIA FRESH FRUITS AND VEGETABLES (REGIONS), 1954 [a]

(Carlots or Carlot Equivalents)

[a] Rail unload figures are for 100 U. S. and five Canadian cities. Truck shipments represent destinations as shown on bills of lading. Truck unloads at California terminal markets are not included. Percentages represent proportions of total shipments from California.

in cartons increased, and volume shipped in bulk decreased. Packing of celery in fiberboard cartons showed a steady increase.

Packing of Imperial Valley lettuce in cardboard cartons became almost complete for the deal as a whole. Ice pack movement in the forepart of the 1955-56 deal was light and confined almost entirely to truck movement. Competition from other lettuce areas increased, particularly from the lower Rio Grande Valley of Texas. Increased plantings in the Phoenix and Blythe areas had a noticeable effect in the marketing of Imperial Valley lettuce.

Emphasis in Imperial Valley carrots has turned definitely to topped carrots rather than bunched packs. Generally speaking, recent bunched carrot movement has been confined to truck shipments to western markets, since only limited outlets are available for bunched packs in the main eastern receiving terminals. Other movement in bulk was on the increase for later packaging at terminals and distribution centers. Texas competition continued extremely heavy during the Imperial Valley shipping season.

Imperial cantaloups in 1955 were very disappointing from the standpoints of quality and yield. Most shippers lost money on their operation.

Rail shipments from the Santa Maria-Guadalupe-Oceano district declined from 1954. Main shipments were celery, mixed cars, cauliflower, broccoli, lettuce and potatoes. Celery and broccoli brought favorable returns to most growers throughout the year. Cauliflower and potato crops generally lost money. Lettuce was profitable at intervals. Dry weather in New York and Michigan during the summer months was favorable for marketing California summer celery. Fair to good demand and high yields the remainder of the year made for the profitable season. Reduced broccoli acreages created an active demand from both fresh market buyers and processors. Competition from Long Island, Texas, and Florida cauliflower made local growers hard pressed to market their crops advantageously. Pota-

toes met a limited demand; yields were poor and sizes small, and in most cases growers lost money. Some lettuce growers realized a profit and others a loss, depending on market conditions at time of harvesting. Prices were highest from mid-June to mid-September.

Outstanding features of the 1955 Kern district potato season were very high prices early and very low prices at the close. Frosts in other early states reduced competition, and cool spring weather in Kern district retarded harvest. Regulations of the state marketing order made inspection of Long White potatoes compulsory and for a part of the season restricted size to two-inch minimum. Offerings of premium size packs were increased considerably. These generally varied between six-ounce minimum and 16-ounce maximum. Packaging in 10-pound paper sacks continued to increase. Early in the season a few potatoes were marketed for the first time in 50-pound cartons.

Planting of onions in Kern District increased slightly during 1955 in contrast to the downward trend of the immediate postwar years. Prices were generally unsatisfactory and demand almost entirely lacking throughout the season.

Two separate corn crops are marketed from Kern District, one in late spring and the other in late fall. The 1955 spring crop met severe competition from other districts and was sold at prices generally below profitable levels to growers. Prices for the fall crop were slightly above production and marketing costs and were more satisfactory to growers.

As in the case of corn, peas are marketed in the spring and fall. Mild temperatures in 1955 permitted spring harvest to continue longer than usual. Grower prices for both crops were satisfactory in 1955.

The early summer tomato crop proved disappointing to central San Joaquin Valley growers in view of the fact that plantings were heavy. Adverse climatic conditions retarded harvesting and made for erratic sizing, with a preponderance of small sizes. Marketings for fresh use were well under 1954. F.o.b. prices followed a declining pattern throughout the season.

The westside San Joaquin Valley cantaloupe deal probably was the most disappointing in the long history of the district. Features of the season included a record high acreage, unfavorable weather which retarded maturity, a packing house labor dispute which curtailed packing at the peak of the season, establishment of a marketing order under state laws and the lowest average price since 1944. The trend of f.o.b. prices was generally downward. Some higher prices were received when supplies available for rail shipments were reduced by the labor difficulties. There were fluctuations in demand and prices at other times. Prices closed the season somewhat above midseason levels.

Partly reflecting the freezing losses to Southern states peaches, fresh marketing of California apricots was moderately heavy. Eastern auction sales volume increased 50 percent over 1954. Auction prices averaged $4.18 per lug, or two cents below 1954 and six cents below 1952, but otherwise the highest of record.

Recorded marketings of nectarines were 27 percent above 1954. Buying demand ranged from slow to fairly good. Quettas were mostly rolled unsold. Other varieties were traded heavily on an f.o.b. basis. Eastern auction sales increased 12 percent over 1954. Auction prices averaged 48 cents higher at $3.48 per package.

As a result of disastrous freezing losses in Southern states, California produced two-thirds of the national peach crop, compared to the normal one-half of previous years. Interstate shipments from California reached an all-time high. Probably for the first time of record, initial United States carlot shipments originated in California. Prices for the California freestone crop for all uses averaged the highest since 1950.

Demand was exceedingly active for early California varieties at very high prices. An outstanding feature was the movement of "soft" varieties in cup packs to eastern seaboard markets which ordinarily never are reached by California peaches. Midseason prices failed to hold at the anticipated high levels and were only fair by comparison. Prices for late peaches were disappointing to California growers though more favorable than in other recent seasons.

Eastern auction sales of California peaches were over twice those of 1954 and the greatest of 20-year records. Auction prices for boxes averaged 18 cents above 1954 at $2.13, and for lugs 25 cents above 1954 at $3.20. Auction sales included many of the new early varieties and some of the early varieties not normally shipped to the East.

Plum production was heavy, and marketings were above 1954; quality and sizes

were satisfactory. F.o.b. prices were above 1954 on early varieties but generally below on late varieties. Eastern auction sales volume was 41 percent above 1954. Auction prices for all varieties combined averaged 68 cents a crate below 1954 at $3.97.

Shipments of California pears to out-of-state markets fell 30 percent below the heavy movement of 1954, reflecting the smaller crop and heavy takings by canners. Nearly 90 percent of the total outbound shipments were Bartletts. Eastern auction sales of Bartletts were 24 percent under 1954. Auction prices averaged 6 cents above 1954 at $5.31 per box.

The grape crop was among the heaviest of record, and prices to growers averaged well below 1954. Rail movement of fresh grapes increased 8 percent, outbound truck movement 4 percent, and receipts at major California terminal markets 11 percent over 1954. Marketing of fresh table grapes followed an exceedingly variable pattern. Desert area and earliest San Joaquin Valley supplies gave favorable returns. With the heavy production, midseason and late area supplies gave less favorable returns. Supplies accumulated at terminals, and both f.o.b. and Eastern auction prices trended downward. Loading holidays were employed to alleviate accumulations. Eastern auction sales volume was about the same as for 1954, and prices mostly lower. Cold storage holdings reached the highest volume of record. The storage deal proved disappointing to most growers.

A strong demand for strawberries for freezing resulted in nearly two-thirds of the State's record production being frozen. Volume moved to the fresh markets was about 10 percent less than in 1954 and the lightest since 1951. Prices for both fresh and processing berries averaged higher than in 1954.

Dried Fruits and Wine

The bulk dessert wine market weakened slightly during the early summer months as it became apparent that the 1955 grape crop would be heavy. Prices declined from 55 cents per gallon during the middle of May to 47½ cents at the middle of September. The market then stabilized and remained practically unchanged the rest of the year. Table wines held generally steady with prices little changed from those of the previous two or three years.

Approximately 1,520,000 tons of grapes were crushed for wine, brandy, concentrate, juice and vinegar. This was the third largest tonnage on record, exceeded only by 1946 and 1951. Sugar content of the grapes generally was below average. Prices paid were somewhat below 1954.

Raisin production was moderately heavy, and a portion of the natural Thompson Seedless was pooled under provisions of the amended federal marketing order. Other types were not in burdensome supply, and all were salable. Buying of the crop was slow to start as growers and packers awaited establishment of percentages to be pooled. Once these were established, growers sold and packers bought very rapidly. The big bulk of the crop was out of growers' hands by the end of 1955, an early date. Prices held generally steady to firm during trading.

Record high prices for large prunes, moderate prices for small prunes, a very active demand with quick grower sales of the crop, and a small crop equal to 1952 but otherwise the lightest since 1929 featured the 1955 dried prune marketing season. A moderate carryover with few large sizes stimulated a very active demand for large prunes suitable for packaging. Grower reaction to first price offers for large prunes was negative. Supplies were short and quotations advanced under strong buying competition to a level above early grower asking prices. The 16-cent basis paid for large French prunes was the highest of record. In contrast, supplies of small prunes were adequate and demand slow, yet packers readily bought all grower crops as offered in order to obtain the larger sizes. Prices paid growers for small prunes were well below those for large prunes but higher than in 1954.

Packer buying of dried apricots began slowly due to uncertainty over quantity to be dried. The harvest season was lengthened by cool weather. Fruit was slightly smaller than average. Once buying began, trading proceeded rapidly. Tie-in deals with other wanted crops speeded trading in some districts. Packer sales of 2,100 tons at the close of the season for the national school lunch program gave strength to the market. Prices to growers averaged the lowest since 1951 and about 6½ cents per pound below the record high 1954 prices.

Packer solicitation for dried peaches began early because of anticipated relatively small production and a light carryover from the 1954 crop. A large portion of the

total dried tonnage moved on open price or minimum guarantee price contracts. Tie-in deals with wanted crops was a factor in moving the dried peaches also. The market weakened late in the season as prospects for a normal dried tonnage became apparent. Trading was slow after the price decline. Prices to growers averaged the highest since 1945 and were approximately 2 cents per pound above 1954.

First packer price offers to growers for dried figs met considerable resistance. Demand for Calimyrnas was exceptionally active, however, resulting in rapid price agreements. Black Missions for the most part also moved early in the buying period. Adriatics and Kadotas, previously in slow demand, were absorbed shortly after the Calimyrnas and Back Missions moved. Prices near the close of buying were well above earlier prices.

Bureau of Milk Control

D. A. WEINLAND, *Chief*
W. J. HUNT, Jr., *Assistant Chief*

The functions of the Bureau of Milk Control relate to the provisions of Chapters 14, 15, 16 and 17 of the Agricultural Code of California. These provisions involve the establishment and enforcement of minimum prices for fluid milk and fluid cream at both the producer and resale levels. They also include the enforcement of the laws relating to unfair trade practices in the marketing of dairy products in California. In addition, this bureau has responsibilities in connection with two separate laws dealing severally with Produce Exchanges and with the California Dairy Industry Advisory Board.

During the year 1955, the estimated production of market milk in California was approximately 4.7 percent greater than during 1954. The utilization of market milk in fluid market milk products increased about 6.7 percent. The average milk-fat content of market milk produced in California during 1955 was 3.74 percent, as compared with 3.75 percent in 1954. Fluid market milk products sold in this State during 1955 contained an average of 3.91 percent milk fat. In 1954, the comparable percentage was 3.94.

Between 1954 and 1955, total sales of fluid milk in California increased approximately 6.4 percent. Sales of fluid skim milk increased 17.1 percent; sales of chocolate drink, 10.7 percent; sales of half-and-half, 3.5 percent; and sales of fluid cream, 2.7 percent.

Class 1 fluid milk prices in most marketing areas of California have not changed significantly during the past two years. Prices paid producers for manufacturing milk have increased about 3 cents per 100 pounds of milk containing 3.8 percent milk fat. As a result of this situation, the differentials between Class 1 fluid milk prices and the prices of manufacturing milk have remained reasonably stable at levels above those of earlier years.

A hearing was held in January of 1955 for the purpose of amending the Stabilization and Marketing Plan effective in the Del Norte-Humboldt Marketing Area. Effective February 1, 1955, the Stabilization and Marketing Plan was amended, and minimum prices to be paid to producers were established on a per pound of milk fat and a per hundredweight of skim milk basis. Prior to this amendment, the minimum price required to be paid to producers was on a per hundredweight of whole milk basis.

During March and April, 1955, five consolidated hearings were held for the purpose of amending the effective minimum

RECORDED ANNUAL SALES OF FLUID MARKET MILK PRODUCTS IN CALIFORNIA

(thousand gallons)

Year	Fluid milk	Skim milk	Chocolate drink	Half-and-half	Fluid cream	Total
1950	330,740	7,394	6,240	15,267	3,756	363,397
1951	352,818	9,673	6,803	15,397	3,463	388,154
1952	375,563	11,110	7,352	15,708	3,384	413,117
1953	389,028	12,314	7,498	15,822	3,288	427,950
1954	398,069	13,958	7,225	15,641	3,247	438,140
1955*	423,545	16,345	7,998	16,188	3,335	467,411

* Preliminary estimates.

PRODUCTION AND UTILIZATION OF MARKET SKIM MILK IN CALIFORNIA

Year	Production (thousand pounds)	Class 1 usage (thousand pounds)	Other than Class 1 usage	
			(thousand pounds)	(percent of production)
1950	3,562,950	2,996,574	566,376	15.9
1951	3,742,598	3,203,243	539,355	14.4
1952	3,878,230	3,410,938	467,292	12.0
1953	4,231,650	3,534,477	697,173	16.5
1954	4,408,723	3,619,510	789,213	17.9
1955*	4,615,933	3,862,628	753,305	16.3

* Preliminary estimates.

PRODUCTION AND UTILIZATION OF MARKET MILK FAT IN CALIFORNIA

Year	Production (thousand pounds)	Class 1 usage (thousand pounds)	Other than Class 1 usage	
			(thousand pounds)	(percent of production)
1950	142,842	128,640	14,202	9.9
1951	149,547	134,881	14,666	9.8
1952	153,077	141,868	11,209	7.3
1953	164,871	145,893	18,978	11.5
1954	171,621	148,494	23,127	13.5
1955*	179,172	157,107	22,065	12.3

* Preliminary estimates.

prices established for third-quart and three-quarter pint containers. These consolidated hearings embraced 31 of the 37 marketing areas in the State. Effective April 25, 1955, the minimum wholesale prices for third-quart and three-quarter pint containers of fluid milk were adjusted as a result of the hearings.

Effective May 1, 1955, the Stabilization and Marketing Plan in effect in the San Diego County Marketing Area was amended to include a Sales Stimulation and Consumer Educational Program designed to increase the sale of fluid milk in the San Diego County Marketing Area. The program made effective will continue in effect until April 30, 1958.

During June, 1955, four consolidated hearings were held embracing 36 of the 37 marketing areas in the State, and the minimum wholesale prices established for fluid milk sold for use in bulk milk dispensing devices were amended. The reduction in minimum wholesale prices established for fluid milk packaged in this type of a container ranged from 5 to 7 cents per gallon.

During August, 1955, six consolidated hearings and two individual hearings were held for the purpose of establishing separate values for the milk fat and skim milk components of fluid milk, and effective September 16 separate minimum prices were established for the milk fat component of fluid milk and the skim milk component of fluid milk. This method of pricing is a new method, which was required as of September 7, 1955, by legislation enacted by the 1955 Session of the California Legislature.

Effective November 1, 1955, the boundaries of the Butte County Marketing Area were modified to include all of Glenn County, and the area was renamed Butte-Glenn Marketing Area. As a result of a hearing held in December, the boundaries of the Los Angeles County Marketing Area and the San Bernardino-Riverside Marketing Area were modified, resulting in a portion of the San Bernardino-Riverside Marketing Area now being included in the Los Angeles County Marketing Area. These modifications became effective January 1, 1956.

At the request of milk producers throughout the State, four consolidated hearings, covering all areas except the Del Norte-Humboldt Marketing Area, were held for the purpose of ascertaining whether or not the effective minimum prices required to be paid to producers for fluid milk should be changed. After a careful study and analysis of the testimony and data received at these hearings, together with other facts and information, the conclusion was

COMPARISON OF CLASS 1 FLUID MILK PRICES IN THE LOS ANGELES COUNTY AND SAN FRANCISCO MARKETING AREAS WITH MANUFACTURING MILK PRICES IN THE SAN JOAQUIN VALLEY

(dollars per 100 pounds of 3.8 percent milk, f.o.b. plant)

Year	Class 1 fluid milk prices		Manufacturing milk prices[1]	Differentials[2]	
	Los Angeles	San Francisco	San Joaquin Valley	Los Angeles	San Francisco
1950	4.74	4.58	3.26	1.48	1.32
1951	5.36	5.14	3.98	1.38	1.16
1952	6.07	5.77	4.46	1.61	1.31
1953	5.86	5.55	3.96	1.90	1.59
1954	5.25	5.02	3.33	1.92	1.69
1955	5.25	5.00	3.36	1.89	1.64

[1] Average prices reported by five major plants.
[2] Excess of Class 1 fluid milk prices over manufacturing milk prices.

AVERAGE RETAIL PRICES OF STANDARD GRADE FLUID MILK DELIVERED TO HOMES IN LOS ANGELES AND SAN FRANCISCO COMPARED WITH AVERAGE FOR 25 CITIES, UNITED STATES

(cents per quart)

Year	Los Angeles	San Francisco	Twenty-five cities*	Comparison with twenty-five cities	
				Los Angeles	San Francisco
1950	19.0	19.1	19.9	—0.9	—0.8
1951	20.7	20.7	22.0	—1.3	—1.3
1952	22.6	22.6	23.2	—0.6	—1.6
1953	22.8	22.6	23.1	—0.3	—0.5
1954	21.5	21.6	22.8	—1.3	—1.2
1955	21.5	21.5	23.1	—1.6	—1.6

* Milwaukee, Wis.
Cleveland, Ohio
Omaha, Neb.
Minneapolis, Minn.
Seattle, Wash.
Salt Lake City, Utah
Indianapolis, Ind.
Kansas City, Mo.
Detroit, Mich.
Los Angeles, Calif.
San Francisco, Calif.
Portland, Ore.
Louisville, Ky.
Philadelphia, Pa.
Baltimore, Md.
Boston, Mass.
Dallas, Texas
Denver, Colo.
Hartford, Conn.
Washington, D. C.
Pittsburgh, Pa.
Chicago, Ill.
New York, N. Y.
New Orleans, La.
Jacksonville, Fla.

reached that increases in the minimum prices established were not clearly warranted, and no price changes were made.

During December a hearing was held for the purpose of amending the minimum wholesale and minimum retail price order effective in the Fresno Marketing Area, and to consider the establishment of discounts based upon the quantity of fluid milk purchased per delivery at both the wholesale and retail home delivered level. Effective January 3, 1956, the minimum wholesale and minimum retail price order issued for the Fresno Marketing Area was amended, and discounts based upon the quantities of fluid milk purchased per single delivery were established.

The 1955 California Legislature, in conjunction with other amendments, made two major amendments to the California Milk Control Law. One of these specifically required the establishment of minimum prices required to be paid producers based upon the utilization of the milk fat and the utilization of the skim milk components of the fluid milk. The other amendment changed the standards required to be followed in establishing minimum wholesale and minimum retail prices, and made permissive the establishment of prices based upon the quantity of fluid milk sold per single delivery.

The Sales Stimulation and Consumer Educational Program for the Sacramento Marketing Area was continued another two years, expiring on December 31, 1957.

Information was secured from 467 market milk producers and 72 manufacturing milk producers relative to the cost of producing both market milk and manufacturing milk. Cost studies of fluid milk distribution were conducted for 51 processing plants.

The legal action filed by Safeway Stores in the Kings County Superior Court during 1953, challenging the constitutionality of the resale provisions of the California Milk Control Law and the validity of the minimum wholesale and minimum retail price order made effective in the Kings County Marketing Area, which came to trial in June of 1954, was finally concluded in October of 1955. Before the judge of the court could render a decision, he passed away.

The bureau filed 20 court actions during the year, seven of which are still pending. Collections in civil penalties amounted to $18,200. There were no court actions filed against the bureau during 1955.

During the year, the bureau took action on the licenses of 12 fluid milk distributors, in accordance with the provisions of the Administrative Procedure Act. Following the filing of accusations or statements of issues in connection with these licenses, five were placed on probation, two were denied, one license was issued, and the decisions with regard to four are still pending.

Auditing by the bureau of payments to producers by distributors for fluid milk resulted in the recovery of approximately $179,310 for 1,668 fluid milk producers. The bureau also recovered $5,000 for one fluid milk producer through action on a milk distributor's surety bond filed in accordance with the provisions of the law.

During October, 1955, the bureau held nomination meetings throughout the State for the purpose of receiving nominations for appointment to the California Dairy Industry Advisory Board. After the nominations were received, 11 appointments were made, eight to fill vacancies created by expiring terms and three to fill vacancies due to resignations of three members.

DAIRY INDUSTRY ADVISORY BOARD

The California Dairy Industry Advisory Board was established under enabling legislation adopted in 1945. The purpose of the program is to enable the dairy industry to develop and expand markets for milk and dairy products produced, processed, manufactured, and sold within the State of California. The statute requires the State Director of Agriculture to prepare and disseminate accurate and scientific information relative to the healthful qualities of milk and dairy products, their food values, methods, care and precautions necessary to their proper production, processing, manufacture and distribution; and the benefits derived from adequate consumption of dairy products.

The programs required to be carried on by the statute are financed by an assessment levied upon all producers, distributors and manufacturers of milk and dairy products within the State. The assessments provide a budget of approximately $450,000 a year. The board, appointed by the director from nominations made by the industry, consists of 25 members representing all segments of the industry. The activities of the board are carried on under the direction of a manager, with the principal office located in Sacramento. The major activities carried on are divided into four classifications: Education, Publicity, Research and Advertising.

There has been developed a well-established program in the educational field which carries the story of the dairy industry to a vast and influential consumer audience: the school population and their parents. The school materials of the board are prepared for the California curriculum and fit into the regular course of study. Distribution of these materials is made on a direct request basis from the school administrators and teachers. The materials provided include films, filmstrips, posters and pamphlets.

The board initiates programs with food page editors, home economists, and television food programs for the purpose of educating California families to the better and fuller use of milk and dairy products in their daily diets. Exhibits and displays are presented at California's two principal fairs. The board carries on an extensive promotional campaign supporting June as Dairy Month.

The research projects carried on by the Dairy Industry Advisory Board are designed primarily to develop and/or discover the health, food, therapeutic, dietetic, and industrial uses of milk and its products and derivatives. Research projects are carried on by the research staff of the University of California College of Agriculture, Davis, and the School of Medicine, University of Southern California.

The board's advertising program is planned and timed to take full advantage of the seasonal fluctuations in production, together with the natural sales appeal of milk and all dairy products. The 1955 advertising program carried extensive newspaper coverage throughout the State of California on a year-round basis.

Supplementing the activities of the California Dairy Industry Advisory Board are three area programs: Alameda-Contra Costa, Sacramento, and San Diego. These programs operate under the provisions of the Milk Control Act and do direct newspaper, radio, billboard and television promotions on behalf of Grade A milk and cream.

Bureau of Shipping Point Inspection

W. F. ALLEWELT, *Chief*
H. H. PETERSON, *Assistant Chief*

The Bureau of Shipping Point Inspection operates an optional self-supporting inspection service, conducted in cooperation with the United States Department of Agriculture. Fruits, nuts and vegetables in producing districts throughout the State are inspected and certified, generally on the basis of United States standards. Such work is conducted throughout the United States by various state organizations cooperating with the federal department, which also maintains a correlated inspection in all important receiving markets.

Certificates of inspection, by specific legislation, are receivable as prima facie evidence in both California state courts and federal courts. Inspections are made only upon request of persons having a financial interest in the products, principally growers and shippers. No regulatory functions or powers are involved.

This service in California, since its organization in 1920, has been completely self-supporting from charges made for inspections requested and performed.

Optional United States standards have been established by the United States Department of Agriculture for all fruits, nuts and vegetables of any importance. The inspection service in California has assisted in the development and revision of such standards for many fruits, nuts and vegetables.

Standards for any product, which usually include a series of grades, each with specific requirements covering factors of quality, condition, size, grade and pack, are used to determine the relative values of different lots of any commodity.

The term "quality" covers permanent characteristics of a product such as cleanliness, shape, growth cracks, scars and other blemishes. "Condition" refers to those factors which are subject to change, including maturity, freshness and diseases which may develop in shipment or storage. "Size" provisions may specify the minimum or maximum size of specimens allowed in any grade, and may include a percentage of the contents of any container or lot which must be within a more restricted range of size. "Pack" refers to the use in the container of liners, pads, curtains, shims, wraps, etc., but particularly to the uniformity of size and the arrangement of the specimens, and to the tightness or filling of the container.

In making an inspection the inspector selects filled containers which are representative of the lot of produce to be certified. He removes the contents, and for each container makes a detailed score covering all of the factors of quality, condition, size, grade and pack which apply to the standards for the product. When the inspection is completed he prepares a detailed certificate, showing the facts as determined by his examination. Other information, including such factors as the number and kind of containers, the variety of the product, the brands or labels, the method of loading, etc., is determined and included in the certificate.

Inspections usually are made in the packing house or in the field as the products are being graded, packed and loaded for shipment. Any possible information and assistance are given to the grower or packer in connection with harvesting, handling, sizing, grading and packing operations to enable him to understand and to comply with the grades.

The inspection certificates based on the U. S. Standards are very widely used throughout the United States, and in Canada and other foreign markets, as the basis of sale of fruits, nuts and vegetables. They also are used in connection with claims between shippers and receivers or transportation agencies, including the settlement of cases under the Federal Perishable Agricultural Commodities Act and California marketing legislation. The service is used to insure and to show compliance with the requirements of a number of federal and California marketing orders.

The certificates are required by the United States Apple and Pear Export Act on shipments of these two products to foreign markets, and are required by the Cana-

dian government on imports of a number of products. They furnish the basis of purchase by the U. S. Quartermaster Market Center of a large volume of fruits and vegetables for the armed services, and also are required in connection with various U. S. Government subsidy programs.

Our work in 1955, on approximately 50 different products, covered the equivalent of 192,000 carlots, compared with 166,000 last year, and the former record figure of 174,000 in 1952.

Under California State Marketing Orders inspections were made on:

Desert grapefruit.
Bartlett pears for canning.
Fall and winter pears for canning.
Long white potatoes.
Delta white potatoes.

Work was performed under Federal Marketing Orders covering: desert grapefruit; Bartlett pears; Tokay grapes; plums; Elberta peaches; surplus almonds; fall and winter pears (Oregon-Washington-California Agreement).

Ten branch offices are operated on a permanent basis, and 15 others for periods from a few weeks up to about 10 months. Each of these branch offices is under the management of an inspector with many years of experience in this work.

General direction and supervision of the work is handled by the chief of the bureau, two assistant chiefs, and two supervising inspectors. This supervisory force also has the federal responsibility for the conduct of this work in California.

The inspection force employed varied from a low of from 86 to 100 during the latter part of February, the month of March, and most of April, to a high of 300 to 325 the latter half of June, the month of July, and most of August. The average for the year was 174 men. The inspectors are employed under state civil service by the California Department of Agriculture, and are licensed by the U. S. Department of Agriculture.

Canning Pear Inspections

A total of 230,567 tons of Bartlett pears for canning was inspected, including 3,114 tons rejected for failure to comply with required grades. Fall and winter pears for canning totaled 24,299 tons inspected, including 210 tons rejected.

Desert Grapefruit

Inspections of desert grapefruit covered 811,602 boxes, or the equivalent of 1,757 carloads.

Regular Shipping Point Inspections

In addition to the special work on canning pears and desert grapefruit, regular shipping point inspections covered 176,067 carloads, compared with 148,371 in 1954, 154,710 in 1953, and 159,551 in 1952.

The following table shows inspections of the principal commodities compared with figures for the three previous years:

	1955	*1954*	*1953*	*1952*
Potatoes	54,112	27,442	35,612	30,603
Grapes	26,423	24,952	21,351	26,266
Lettuce	20,626	20,517	23,403	26,029
Celery	15,610	16,546	16,785	14,513
Tomatoes	8,065	9,208	8,160	7,211
Oranges	7,611	6,688	9,794	9,976
Plums	7,529	6,099	6,454	3,646
Peaches	6,313	4,919	4,748	5,241
Pears	5,084	6,100	4,848	7,129
Carrots	4,334	5,432	4,757	7,952
Onions	2,518	3,475	3,805	4,007
Lemons	1,986	1,258	611	1,008
Cabbage	1,868	1,440	1,468	1,898
Cauliflower	1,522	1,996	1,505	2,548
Strawberries	1,366	1,075	832	817
Corn	1,361	1,864	1,140	781
Apples	1,344	1,332	1,807	3,038

Bureau of Weights and Measures

J. E. BRENTON, *Chief*
BURRIS G. WOOD, *Assistant Chief*

The following report of the Bureau of Weights and Measures, State Department of Agriculture, summarizes the work of the state employees, county sealers of weights and measures and deputy state sealers acting under the supervision and direction of the Director of Agriculture during the calendar year 1955.

The laws of the State of California relevant to weights and measures are contained in the Business and Professions Code, specifically, Division 5 and Division 8. In addition to provisions specifically applicable to weights and measures as contained in Division 5 of the Business and Professions Code. there are also provisions relevant to standard bread loaf, petroleum and antifreeze which are contained in Division 8 of the Business and Professions Code, and effective January 1, 1956, provisions relevant to brake fluid. Chapter 8 of Title 4 of the California Administrative Code contains therein specifications and tolerances relevant to commercial weighing and measuring devices and standard weights and measures.

In addition to the annual testing of all weighing and measuring devices in their respective counties, county weights and measures officials have also assisted the state department in the enforcement of the public weighmaster laws, petroleum products inspection, the establishment of tare weights for field lug boxes used for deliveries of edible agricultural commodities to processors or other handlers, regulating the sale of antifreeze, and the laws which apply to any and all commodities sold in containers.

Aside from the work as performed by the county weights and measures officials, employees of this bureau inspected 2,579 vehicle scales; 1,674 dispensing devices used in connection with the sale and measure of liquefied petroleum gas; 2,104 liquefied petroleum gas vapor meters; and various farm holding tanks and provers.

In addition to the above, employees of this agency also inspected the following county standards used by the respective county sealers of weights and measures: 2,992 weights, 182 liquid measures, and 35 linear measures. Also, 47 approvals were issued by this bureau for various new type weighing and measuring instruments which are to be used in the State of California.

During the 1954-55 Fiscal Year, this bureau issued 2,440 public weighmaster licenses; 1,415 branch locations and 13,337 deputy public weighmaster licenses, a total of 17,192 licenses issued under the provisions of Chapter 7, Division 5, Business and Professions Code of the State of California.

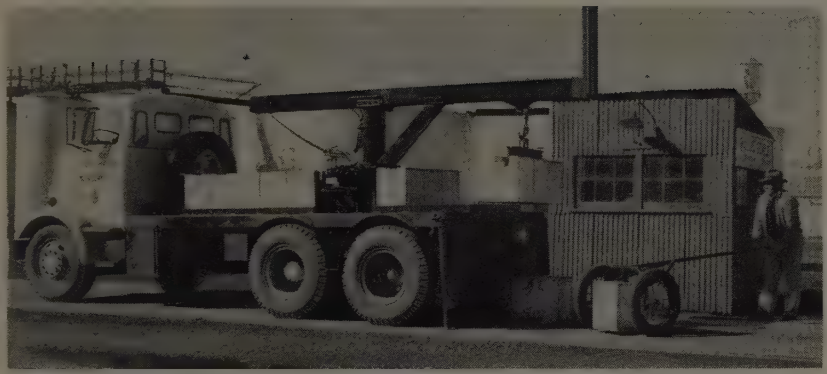
The accompanying table contains a recapitulation of all weights and measures inspections as performed by the state and county weights and measures officials during 1955.

The increase of automotive vehicles in the State of California has resulted in the increase of the retail sale of gasoline, other motor fuel, and motor oil for automotive purposes.

According to our file records, there are in excess of 83,600 retail dispensing devices being used in this State. In addition to these 83,600 retail devices which must be inspected annually for accuracy, there are actually thousands of bulk motor oil containers and sealed quart cans which are also a part of the essential equipment that makes up our modern service stations and garages.

This bureau maintains state inspectors with headquarters in San Diego, Fresno, South Gate, Redlands, San Francisco and Sacramento. This bureau also maintains petroleum products laboratories at South Gate and Sacramento.

During the 1955 calendar year, state and county weights and measures officials made 55,026 inspections of service stations and garages; 1,475 citations were issued requesting adherence to the provisions as contained in Chapter 7, Petroleum, Division 8, Business and Professions Code of the State of California; 5,303 samples were tested in the laboratories; 4,619 sign corrections were made; 69 office hearings were held; 90 persons were prosecuted and 88 convictions were secured.



Typical of the modern equipment used by the Bureau of Weights and Measures is the heavy capacity vehicle scale-testing equipment shown above

Establishments visited during 1955			182,807
Packages or containers inspected	Light	126,698	
	Correct	3,191,666	
	Heavy	30,257	
	Total		3,348,621
Lubricating oil bottles tested for capacity	Inspected	92,218	
	Passed	87,076	
	Condemned and Confiscated	2,933	

	Sealed without correction	Sealed after correction	Out of order	Condemned and Confiscated
Counter (other than computing)	20,070	6,913	1,823	102
Spring	34,773	11,268	1,716	414
Computing	54,092	28,241	6,682	288
Platform and dormant	24,394	17,570	4,768	159
Tank	175	124	27	1
Hopper	884	1,039	386	1
Livestock	1,520	905	334	15
Vehicle	3,007	2,326	1,072	48
Person Weighers	8,810	2,392	1,290	167
Meat beams and steelyards	2,486	1,388	388	17
Abattoir (Monorail)	1,158	971	421	7
Prescription	2,752	1,453	104	17
Railroad track	51	89	15	
Weights	234,301	5,478	1,290	1,233
Vehicle tank compartments gauged	1,595	1,465	352	
Vehicle tank meters	2,230	2,471	608	11
Bulk plant meters	711	525	122	1
Retail pumps and meters	88,429	16,026	9,640	84
Lubricating oil meters (retail)	1,636	37	79	1
Grease meters	20,811	614	895	64
Linear measures	7,809	62	298	64
Liquid capacity measures	85,425	456	114	42
Farm holding tanks	1,092	203	226	
Totals	598,211	102,016	32,650	2,736

Prosecutions	151
Convictions	165
Acquittals	9
Citations	99
Cases pending	33
Otherwise disposed of	152
Total fines paid	$7,015

Division of Plant Industry

CHAS. V. DICK, *Chief*

The Division of Plant Industry includes the Bureaus of Entomology, Plant Pathology, Plant Quarantine, Rodent and Weed Control and Seed Inspection, Chemistry and Field Crops.

Primary responsibilities of the division are:

1. Prevention of the introduction and spread of plant diseases, noxious weeds and crop pests such as insects and other animals. This function involves quarantine action, detection surveys and suppressive measures.

2. Control of predatory animals as a protection to the livestock industry.

3. Prevention of fraud and deception in the marketing of particular commodities used by producers, such as livestock feeding stuffs, seeds, fertilizers and pesticides.

4. Regulation of the use of agricultural chemicals to obtain satisfactory control and prevent damage to persons and property. This work is coordinated with farmers and commercial pest control operators who apply such materials, as well as checking produce (including hay and livestock feed stuffs) for spray residue.

5. Grading of field crops under United States grades.

6. Regulation of agricultural warehouses.

DIVISION OF
PLANT INDUSTRY

CHAS. V. DICK, *Chief*

Chemistry
Entomology
Field Crops
Plant Pathology
Plant Quarantine
Rodent and Weed Control
and Seed Inspection

Bureau of Chemistry

ALLEN B. LEMMON, *Chief*
R. Z. ROLLINS, *Assistant Chief*

The Bureau of Chemistry administers five portions of the Agricultural Code pertaining to: (1) registration, labeling, and sale of fertilizing materials; (2) registration, labeling, and sale of pesticides; (3) use and application of injurious materials; (4) pesticide residues on produce; and, (5) regulation of the agricultural pest control business.

REGISTRATION, LICENSES, AND PERMITS

The law requires a person or firm to secure appropriate registration, on a fiscal year basis, before selling any commercial fertilizer, agricultural mineral, auxiliary plant chemical or pesticide under his name in California. In addition to registering the name of the person or firm, registration is secured for each brand under which commercial fertilizer is sold, and specific registration is secured for each variously labeled brand name commercial fertilizer, and each agricultural mineral, auxiliary plant chemical and pesticide.

Commercial fertilizers are fertilizing materials containing 5 percent or more of nitrogen, available phosphoric acid, and soluble potash, singly or collectively. During the Fiscal Year 1954-55, certificates of registration to sell commercial fertilizers were issued to 345 firms, 40 more than were issued during the previous fiscal year. In securing registration, these firms register any brands or brand names they intend to use. They registered 387 brands and 765 brand name products, and 40 firms were registered who sell only under common names.

Agricultural minerals are mineral substances which contain less than 5 percent of the three plant foods mentioned above. Certificates of registration were issued to 173 firms to sell 564 agricultural minerals, during the Fiscal Year 1954-55, compared with 180 firms registered during the previous fiscal year.

Auxiliary plant chemicals are fertilizing materials such as hormones for promoting the rooting of cuttings, materials for reducing the preharvest drop of fruit, and bacterial inoculants for legumes. Certificates of registration were issued to 27 firms to sell 119 such products during 1954-55. The number of firms which have registered auxiliary plant chemicals has not changed materially during the past five years.

Fertilizer jobbers are persons who may purchase commercial fertilizers and agricultural minerals for resale to other registrants, without payment of the tonnage license tax. Certificates were issued to 12 fertilizer jobbers during the Fiscal Year 1954-55, which is the same number issued the previous year.

No registration is required of **manures** or **soil amendments,** which include materials such as peat, leaf mold and potting mixtures. No further registration is required for a dealer to resell any agricultural chemicals in original packages filled and labeled by a registrant.

Pesticides are substances for control of pests and include insecticides, fungicides, herbicides, vermicides, defoliants, disinfectants, sanitizers, repellents, wood preservatives, and substances for control of snails, predatory animals, nematodes, algae, internal and external parasites of livestock, and other unwanted organisms. During the Fiscal Year 1954-55, a total of 972 firms secured registration to sell 11,587 pesticides, which is 25 more firms and 219 more products than were registered during the previous fiscal year. At the start of the 1954-55 Fiscal Year, the general registration fee was raised from $50 to $75, and the restricted types of registration formerly permitted for $10 were replaced with a limited registration for $15 which permits registration of two pesticides with a total retail value of not more than $500 per annum. Under this new arrangement the number of general registrations dropped from 875 to 796 and the number

of limited registrations increased from 72 to 176, compared with the previous year.

The law requires an appropriate license, certificate or permit (on a calendar year basis) to be secured before engaging in certain types of businesses:

Fertilizer Salesmen

A license must be secured to sell any commercial fertilizer, agricultural mineral, or manure except that no license is required to sell such substances in packaged form only from a fixed place of business, if no sales are solicited outside such a place of business. The fee is $2 for a calendar year; no examination is required. During the calendar year, licenses were issued to 2,722 fertilizer salesmen, an increase of 140 over the number in the previous year.

Agricultural Pest Control Operator

A license must be secured to engage for hire in the business of agricultural pest control; the fee is $15 for a calendar year. An applicant must pass an examination covering the proposed scope of his work, and the license shows the specific types of agricultural pest control work which the operator is authorized to conduct. The examination is given jointly by the bureau and the agricultural commissioner of the county in which the applicant lives. During the calendar year, licenses were issued to 1,238 agricultural pest control operators, which is 106 more than were issued the previous year.

Agricultural Aircraft Pilots

A certificate of qualification or an apprentice certificate must be secured to operate any aircraft in the business of pest control. The initial fee is $25 and the renewal fee is $5 for a calendar year. An applicant for such a certificate must have a valid apprentice certificate and submit documentary proof that he has operated aircraft for a certain number of hours in agricultural activities. He must pass a written examination covering the types of work for which he desires to qualify, to demonstrate his ability to conduct pest control operations and his knowledge of the nature and effect of materials used in pest control. Certificates of qualification were issued to 456 agricultural aircraft pilots during 1955, which is approximately the number issued during each of the last four years.

Apprentice Pilots

An apprentice certificate permits operation of aircraft in the business of pest control, under the direct and personal supervision of a person holding a certificate of qualification. The fees are the same as those for the regular pilot, and a written examination covers the types of work for which he desires to qualify. A total of 111 apprentice pilots were certificated during the year, compared with 104 during 1954.

Tree surgeons who perform certain restricted pest control operations incidental to their business of tree surgery may secure a free permit instead of a license. 17 such permits were issued during the year.

Farmers and other persons, who are not regularly engaged in the business of pest control and who operate only in the vicinity of their own property and for the accommodation of their neighbors, may secure a free permit instead of a license. A total of 96 such permits were issued during the year compared with 73 for 1954.

Use-permits, which differ from the permits mentioned above, must be secured from the county agricultural commissioner before using any of the following:

1. Herbicidal preparations containing 2,4-D, 2,4,5-T, MCP, 2,4-DP, or 2,4,5-TP (silvex). Use of certain small amounts is exempt from permit.

2. Calcium arsenate, standard lead arsenate, or copper acetoarsenite Paris green, in a form suitable for application as a dust and delivered in a quantity of more than 50 pounds in any 24-hour period.

3. TEPP, guthion, methyl parathion, EPN, OMPA, or demeton (Systox), regardless of amount.

INSPECTION, SAMPLING, AND ANALYSES

Samples of agricultural chemicals are drawn by inspectors from materials found in the channels of trade and sent to the Sacramento laboratory for examination. Fertilizing materials and pesticides are analyzed to determine conformity with the guaranteed analysis shown on the labeling or, as in the case of manures and soil amendments which the law does not require to be labeled with a guaranteed analysis, analysis

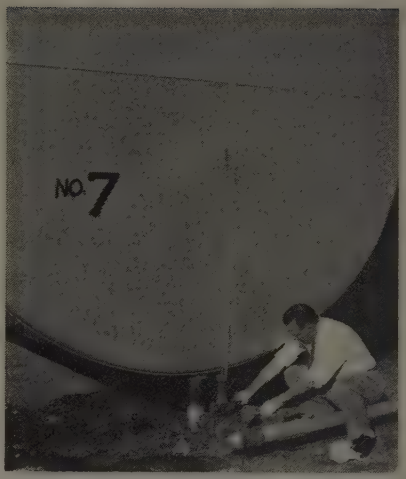
is made to provide information to users concerning composition of the materials. These samples may be drawn from materials still in the hands of a registrant, or in dealers' stocks, or from unopened containers of materials in the hands of a purchaser. Samples are also drawn of produce (fruits, vegetables, fodder) to determine the amount of pesticide residue it may contain. In addition some analytical work is done for guidance of collaborating officials in other agencies.

A total of 9,398 samples were analyzed during 1955, including 3,541 samples of fertilizing materials; 1,787 samples of pesticides; 3,155 samples of produce for pesticide residue; and 915 miscellaneous samples. The detailed results of analysis of each official sample of fertilizing material and pesticide are sent to the registrant or other person who marketed the material and to any dealer or purchaser concerned with the lot represented by the sample. The analyses of fertilizing materials and pesticides are summarized each year in two publications distributed to interested persons.

The samples of **fertilizing materials** included 3,002 samples of commercial fertilizers, of which 494 or 16 percent were found deficient, and 503 samples of agricultural minerals, of which 77 or 15 percent were found deficient. Analysis was also made of 11 manures, 12 auxiliary plant chemicals and 13 soil amendments. All samples of fertilizing materials were analyzed in Sacramento, except for 175 samples of agricultural gypsum analyzed in a field laboratory in Bakersfield.

A total of 1,787 samples of **pesticides** were analyzed, of which 168 or 9 percent were found deficient. There has been a noticeable trend during recent years toward use of multicomponent mixtures. Some years ago, a pesticide commonly contained only one active ingredient. Today it is common for a product to contain two or three active ingredients and serve as a combination insecticide, fungicide and miticide. Such combinations increase the work of quantitative analysis.

Pesticide residues were determined on 2,579 official samples representing as many lots of produce, in order to determine compliance with pesticide tolerances. Of these official samples, 93 or a little less than 4 percent contained excessive amounts of residue, and these lots had to be reconditioned or dumped. In addition 576 confirmatory and investigative samples were analyzed. Occasionally samples were drawn from fields about to be harvested, to provide some information on maximum residues to be expected before produce is conditioned for marketing. Most pesticide residue samples were analyzed in field laboratories close to wholesale markets and packing sheds, where they were drawn to expedite prompt handling. The Los Angeles laboratory analyzed 2,072; San Francisco, 591; San Diego, 327; and Salinas, 165 samples of produce.



Thousands of gallons of ammonia solution used in agriculture require large tanks for storage. Official samples to determine the percentage of nitrogen are taken by inspectors through special outlet valves installed in the supply line.

DDT residue was the most common pesticide residue encountered on produce. In the Los Angeles area, 1,542 samples of fruits and vegetables were analyzed for DDT. None was found on 484 samples. A trace up to one part per million (ppm) was found on 372 samples; 1 to 4 ppm was found on 406 samples; 4 to 7 ppm was found on 221 samples; 7 to 14 ppm was found on 32 samples; and 27 samples contained more than 14 ppm. The state and federal tolerance is 7 ppm for DDT.

Toxaphene residue is fairly common, and 16 samples containing it were overtolerance in the Los Angeles area.

Parathion residues were found on 13 out of 72 samples analyzed for this chemical in

the Los Angeles area; 10 contained a trace to 2 ppm, and three samples contained more than this amount. Parathion residues on strawberries in excess of 1 ppm resulted in several quarantines during the year. Investigation showed that growers were dropping a spoonful of parathion dust into the crown of plants for control of cyclamen mite and were continuing application during the picking season.

Lead arsenate and **calcium arsenate,** which were of concern about 10 years ago, seem to be completely out of the picture. Although 197 samples of fruits and vegetables were analyzed in the Los Angeles area for lead and arsenic, not one sample contained any such residue.

A few analyses were made for **captan** and **malathion,** but no residues were found. No off-flavors from BHC were encountered during the year.

Nicotine residues on Texas variety mustard greens caused symptoms of acute poisoning in 11 persons. Investigation showed that the farmer had applied an unusually high dosage of nicotine sulfate solution to the greens and marketed them the following day. Analysis of the greens showed nicotine residues as high as 69 to 123 ppm two weeks after spraying. The federal tolerance for nicotine residues is 2 ppm.

Interest in pesticide residues usually revolves around their chronic toxicities, the cumulative effect of small amounts eaten over a prolonged period; only in very rare instances have they ever caused acute symptoms. This particular case is the most outstanding one encountered in the 30 years' experience of the bureau in pesticide residue investigations. It is noteworthy that it involved misuse of a pesticide which has been on the market for more than 40 years, and not one of the newer ones.

DDT residues on fodder present a special problem. Although small amounts have no apparent effect on the health of the animals themselves, DDT is accumulated unchanged in the fat of the animal and in their milk. No tolerance has been established for DDT in meat or in milk. Silage made from sweet corn stalks and leaves was found to contain DDT residues as high as 250 ppm, and approximately 10,000 tons of contaminated silage were found to be unfit for feeding.

Endrin residues were found on lettuce where it had been applied in abnormally high dosage within a few days of harvest. Lettuce in some fields was plowed under or stripped severely by growers when analyses showed as high as 3 ppm at maturity. Two carloads shipped from a field where a high dosage of endrin had been applied by mistake, a few days before harvest, were seized in eastern markets by the Federal Food and Drug Administration.

"Dinitro" residues were found on seed crop straw rendering it unsuitable for fodder. Dinitro o-secondary butyl phenol is frequently used as a preharvest spray on legumes raised for seed, to desiccate the foliage and thereby facilitate harvest of the seed. Possible residues of the chemical on the seed are of no health significance, but no tolerance has been established for such residues on fodder.

Most of the 915 miscellaneous samples analyzed during the year represented materials submitted by collaborating county agricultural commissioners or other federal, state or county officials in connection with their official duties. **Avocados** were analyzed for oil content; 79 out of 308 analyzed were found to contain less than 8 percent minimum established by law as a maturity standard. **Honeybees** are frequently analyzed to determine whether death has been caused by pesticides. Although most of the 28 samples of bees analyzed during the year contained no detectable pesticides, some showed evidence of nosema disease; pesticides had evidently caused death in seven cases. The chemicals and the micrograms per bee found were: parathion 0.06; BHC 0.6 and 25; dieldrin 0.04; DDT 0.2 and 48. One sample of bees contained parathion 2.24 percent, obviously indicating malicious poisoning of some hives.

No arsenic was found in any bees. This is in marked contrast to former years when arsenic compounds were commonly involved in losses of honeybees. Ten years ago, for example, arsenic was found in 27 out of 35 samples of bees analyzed for this chemical. On the basis of toxicological work published by entomologists and the bureau's experience in reports of bee losses, pesticides commonly used in agriculture have been grouped into three classes: those which seem to present no hazard to honeybees; those which may be applied in early morning or late evening when bees are not working in blossoms; and those which should not be applied near hives or in

blossoms that bees may work at a later time.

Fodder is sometimes analyzed for chemicals other than pesticide residues to assist cooperating officials in investigations of livestock losses. Some plants under some growing conditions pick up enough **potassium nitrate** to be poisonous to cattle. Some forage and fodder analyzed during the year and the dry-basis amount of potassium nitrate found are: tumbleweed, 5.59 percent; fiddleneck, 3.18 percent; sudan grass, 1.23 percent; oat hay, 0.03 percent and 0.84 percent; alfalfa hay 0.21 percent. Other weeds and grasses contained amounts ranging from a trace to 0.94 percent. It is generally believed that anything above 1.5 percent can cause death of livestock.

Excess nitrates in plants have sometimes been attributed to effects of 2,4-D or nitrogen fertilizers. None of the samples submitted to the bureau appeared to have concerned 2,4-D or fertilizers. However, during the previous year, fiddleneck growing in a fertilized orchard contained potassium nitrate 1.16 percent, while fiddleneck growing in a nearby unfertilized area contained 0.22 percent.

Hydrogen cyanide is sometimes formed in certain plants, making them toxic to animals. This poison was found in samples of sudan grass and milo plants, but none was found in samples of alfalfa hay or various other grasses and weeds submitted for analysis. In one case, freshly cut sudan grass contained hydrogen cyanide, but none was found in the grass a day after it had been cut and wilted. **Molybdenum** is selectively picked up in some plants in amounts that are toxic to livestock. Samples of forage were found to contain 0.5 to 10.0 ppm. Molybdenum poisoning is correlated with copper deficiency. The critical level for molybdenum is believed to be somewhere between 1 ppm, when the copper is less than 5 ppm, and 4 ppm when the copper is up to 10 ppm. The **copper** content of eight samples of pasture grass ranged from 14 to 24 ppm, and the molybdenum content of the same samples ranged from 1.5 to 10.0 ppm. These figures are of interest in connection with use of the two elements in fertilizing practices.

Viscera from livestock and other animals are analyzed in some cases where pesticides might be involved in their death. A total of 59 samples of viscera was analyzed during the year. Arsenic was found in five cases involving cattle. In at least two of these cases, the cattle were known to have had access to areas treated with arsenical weedkillers. In one case where a cow was pastured near a freshly painted bridge, 18 ppm lead was found in the liver, indicating that the cow had died from licking the fresh paint. Strychnine was found in the stomach of a horse, confirming suspicion that it had died from poisoned barley used for control of squirrels in the pasture. Mercury in the stomach of a pig confirmed suspicion that the animal had died from eating seed which had been treated with an organic mercury seed disinfectant. The organs of two healthy deer were found to contain fluorine ranging from 4 to 18 ppm. These analyses were made in an investigation of the death of deer in which poisoning by sodium fluoroacetate rodent bait was suspected. There is no satisfactory method for determining sodium fluoroacetate in viscera, and these tests showed that estimation from total fluorine content would not be reliable.

Some products fumigated with **methyl bromide** for control of Khapra beetle were analyzed to determine residues left in them. Barley, which contained no combined bromine before fumigation, contained combined bromine 39 ppm four days after fumigation. Analysis of the barley again a week later showed the same amount, indicating that the bromine was not present as volatile methyl bromide. Feed fumigated with a mixture of methyl bromide, carbon tetrachloride, ethylene dichloride, and ethylene dibromide contained combined bromine 146 to 154 ppm about five days after fumigation. Milk from cows which fed on this material was said to have an off-odor and to be unfit for sale, but no bromine was found in the milk. Eggs which had been fumigated with methyl bromide contained combined bromine 50 ppm, and unfumigated eggs contained 23 ppm. **Milk** from dairy cattle being fed sweet corn fodder contaminated with DDT was found to contain DDT 2 to 12 ppm. In one case where the fodder contained 19.6 ppm, the milk contained 1.6 ppm.

Analytical Methods—Chemists in the main laboratory cooperated with other members of the Association of Official Agricultural Chemists in collaborative studies of procedures for determining phosphoric acid and boron in fertilizing materials, and gamma isomer of benzene hexachloride in

pesticides. Some work was done on procedures for examination of soil conditioners and of rodenticides containing warfarin and pival. Studies were made of procedures for sampling ammonia solutions and other liquid fertilizing materials.

Chemists from other regulatory offices and from industrial and commercial laboratories spent some time in the bureau's main laboratory to learn new analytical procedures.

Bioassay Laboratory

At any given time in the constant development of agricultural chemicals, there are some compounds, particularly some mixtures, which contain small amounts of certain chemicals for which there is yet no suitably sensitive, specific and accurate method of determination. In such cases, materials may be examined by bioassay, which determines the amount of a toxicant present by the effect that minute quantities have on some organism. For example, there is no chemical method for determining the potency of red squill, used as a rat poison, and official samples of red squill products are therefore bioassayed with white rats. As in former years, the red squill products on the market were found to be of poor quality. Four samples were bioassayed, and all four failed to meet the guaranteed potency. Such products are commonly guaranteed to have a median lethal dose of 500 milligrams per kilogram body-weight. One sample almost met this guarantee with 550 mg./kg., but the others ranged from 650 to 1,140 mg./kg. Such findings over the past 10 years have discouraged marketing red squill products in California. Investigation indicates that manufacturers put the proper amount of red squill in their baits, but the active principle is decomposed during the preparation or cooking of the mixed bait material.

Promising results have been obtained in examining plant and animal tissue for pesticide residue or other toxic materials, by extracting the material with a suitable solvent, removing interfering substances from the extracted mixture by various clean-up procedures, and either dipping houseflies in measured portions of the extracted material or exposing houseflies in petri dishes coated with residues of the extracted material. Mortalities from the tests are compared with those obtained by known amounts of various chemicals.

NEW LEGISLATION, CODE AMENDMENTS AND REGULATIONS

The 1955 Legislature amended Section 1038 of the Agricultural Code to reduce the 10-cent tonnage license tax on agricultural minerals to 3 cents a ton, from October 1, 1955, until the ninety-first day after final adjournment of the 1957 Regular Session of the Legislature. The tonnage license tax on commercial fertilizers had been reduced from 25 cents to 20 cents in 1943, and from 20 cents to 15 cents in 1952, without any reduction in the tax on agricultural minerals. The Legislature now has reduced the tax on agricultural minerals for a limited period, during which a study will be made to determine the fair ratio for rates on the two classes of fertilizing materials.

Section 1083.3 was added to the code making it unlawful to sell or deliver any material or herbicide to any person who is required to have a permit to use it, unless the person signs a statement that he holds a valid permit to use the material.

Section 1011 was revised to clarify authority to establish spray residue tolerances. During the year, the Federal Food and Drug Administration announced tolerances for some 60 pesticide chemicals on many crops. The Agricultural Code has expressed tolerances only for lead, arsenic, fluorine and DDT, and the amendment clearly authorizes the Director of Agriculture to establish additional tolerances to keep state and federal requirements in line.

Section 160.5 was revised, describing a new procedure for a county agricultural commissioner to follow for adoption of rules and regulations governing the application of methods of pest control under local conditions.

No changes were made in the economic poisons article of the Agricultural Code.

Regulations

Four public hearings were held during the year to consider proposed changes in regulations. Following a January hearing in Sacramento, the procedure for sampling fertilizing materials was changed to permit an

inspector to ship to the laboratory the entire portion of material withdrawn by trier from the bags or loose lot of material sampled. Previously inspectors were required to divide the sample into two portions and leave one portion with the person in charge of the lot. An analytical study of portions of samples showed the difficulty of accurately subdividing portions of heterogeneous mixtures under field conditions. Some fertilizing materials are mixtures of fine and coarse particles, light and dense materials, and materials of greatly differing composition. Under the new procedure, the entire sample is sent to the laboratory, where it is first finely ground, thoroughly mixed, and then carefully subdivided to provide the chemist with a more uniformly representative portion for analysis.

Following a hearing at Stockton during April, injurious herbicides regulations were amended to repeal Section 2453(b), which had prohibited application of any injurious herbicide in the Central Valley within one-half mile of a susceptible crop, unless there was a continuous air flow away from the susceptible crop during application. This requirement had proven too restrictive in view of the diversified plantings in that part of the State.

Following hearings at Sacramento and Los Angeles in September, 2,4-DP and 2,4,5-TP (silvex) were included among the injurious herbicides covered by the regulations. The form of statement was presented which the dealer must secure from a purchaser of injurious herbicides or injurious materials as required by the 1955 Legislature. Included as injurious materials were methyl parathion and TEPP in all its forms, instead of only its use as a thermal aerosol. It was necessary to define the uses for which permits were required in such terms that a dealer could determine the need for the permit at the time of sale. Accordingly the regulations were revised to require a permit for calcium arsenate, standard lead arsenate or copper acetoarsenite only when in a form suitable for application as a dust and delivered in a quantity of more than 50 pounds in any 24-hour period. Also exempted from requirement of a permit was use of injurious herbicides delivered in a quantity of not more than one pint of liquid or one pound of dry formulation in any 24-hour period.

A hearing was held in November at Simmler to consider a petition from grain growers in the Carriso Plains, who requested permission to use highly volatile esters of injurious herbicides. The growers stated that the highly volatile esters were much more effective in their area than the other materials, and they were not injurious to other crops in that area of the State. Also considered at the hearing was the proposed exemption from requirement of a permit for dry mixtures containing small amounts of 2,4-D and sold for application to lawns. Evidence and testimony presented at the hearing were being studied at the end of the year.

These regulations were adopted in accordance with authority in the Agricultural Code pertaining to fertilizing materials and injurious materials. No regulations were adopted during the year in connection with code sections pertaining to economic poisons, spray resdue or the agricultural pest control business.

PROSECUTIONS AND SIMILAR ACTIONS

Criminal complaint was filed against a man who repeatedly sold agricultural gypsum without tagging each load and who misrepresented the material to purchasers. He was sentenced to six months in jail on each of the two counts. The sentence was suspended for one year pending his good behavior and compliance with all requirements of law. A county agricultural commissioner filed complaint against a man who used 2,4-D without first obtaining a permit; the man was fined $25. Another agricultural commissioner filed complaints against two agricultural pest control operators who failed to register in the county for each of two years in which they did such work. Both operators were fined $25 on each of two counts, a total of $200. A criminal complaint was filed against two brothers who, after repeated warning, continued to operate a pest control business beyond the vicinity of their own property without a license and without county registration. Each was fined $25 and placed under probation for two years. A structural pest control operator was cited by a city prosecutor for engaging in weed control without an agricultural pest control license. He was permitted to apply for a license after a warning, upon payment of a penalty for late filing;

complaint was withheld on condition of compliance in future operations.

A county agricultural commissioner **suspended county registration** of an agricultural pest control operator for 15 days, because the operator conducted pest control in a careless and negligent manner and filed incomplete reports of work done. Action on the suspension was withheld for one year on condition of good behavior. A hearing was held on the county registration of another operator, because he had applied parathion to strawberries without a permit and he had not properly disposed of emptied bags. Registrations of several other operators were canceled for failure to submit monthly reports. In most cases, the delinquent reports were promptly filed and registration reinstated.

An agricultural commissioner **revoked permit** to apply injurious materials, when the agricultural pest control operator violated the conditions of the permit. The injurious materials permit of another operator was suspended for 30 days, because the operator filed incorrect reports of work done in the county. A commissioner revoked the injurious materials permit of a grower, who failed to conform to the regulations governing use of such materials. The grower appealed to the Director of Agriculture for a hearing on the commissioner's action. After hearing, the commissioner's order was sustained.

ACCIDENTS, DAMAGES, AND INJURIES

Three deaths in California involving pesticides came to the attention of the bureau during 1955. In two separate cases, a man and a woman drank sodium arsenite solution, which was mistaken for wine. In one case the **sodium arsenite** solution had been purchased for control of weeds, and in the other case, for termites. In both cases a remnant of the material had been placed in a wine bottle, the bottle with the wine label had been stored for a long time until the nature of the contents had been forgotten, and the poison had been mistaken for wine. In one of these accidents a third person also drank some of the solution, but recovered after being hospitalized. The third death was of a small child who ate some grain which had been treated with **thallium sulfate** for control of rodents and stored for a number of years without any label. Another child who also ate some of the poisoned grain recovered following hospital treatment.

Parathion was the chemical most commonly involved in reports of injury to people from pesticides, and at least two dozen cases came to the attention of the bureau during the year. Most of the affected people were agricultural pest control operators who were exposed excessively in the course of their work. One man was exposed to drift from material during application by aircraft; another was affected when he began to thin prunes shortly after parathion had been applied to the trees. Two men were affected when they unloaded broken packages and inhaled or absorbed some of the dust. In one case a small child developed characteristic symptoms of cholinesterase depression, although the only exposure which could be accounted for was the fact that her father had been applying parathion shortly before, and the child had played around his contaminated clothes and boots. Citrus sprayers, who in previous years contributed a substantial number of cases of parathion poisoning, had no authenticated injuries reported in Southern California during 1955. The improved record followed an extensive safety campaign wherein hazards were pointed out and information was widely disseminated on safer methods of handling and protection. Many large operators maintain a medical program, whereby periodic checks are made of the blood cholinesterase levels of each employee exposed to organic phosphorus insecticides. Whenever the physician detects a marked drop in cholinesterase activity, the employee is removed from further exposure until his normal level is restored. Some progress was made in instituting a similar medical control program for aircraft operators in the principal alfalfa-growing areas, where more of these insecticides are being used for control of spotted alfalfa aphid. In one instance, after a pilot had narrowly escaped a fatal accident his blood test was so low that a retest was made to verify it. Before the retest could be reported, the pilot was stricken in flight and was just able to land before blacking out.

2,4-Dichlorophenoxyacetic acid continued to be the pesticide most commonly involved

Emptied containers of injurious herbicides should not be abandoned where plants of value are likely to be injured by vapor from material or water flowing over it. Violation of this rule as shown here is a potential cause of trouble.

in reports of damage to crop plants. Damage reported during 1954 had been much less than that in previous years, but 1955 reports showed damage as widespread and as great as had been encountered in the several previous years. Damage to cotton fields occurred when they were sprayed by means of an airplane previously used to apply 2,4-D. Another cotton field was damaged by drift of 2,4-D from banks of a nearby canal, where the chemical had been applied to kill weeds. Symptoms appeared in other cotton fields where the source of the chemical was less obvious. For example, scattered symptoms appeared in a group of cotton fields, although there was no record of any pesticide application on or near the fields. In another case, symptoms seemed to be caused by drift of 2,4-D from rice fields which had been treated, although scattered symptoms appeared as far as eight miles from the rice fields. Blackeye beans showed symptoms after irrigation with water drained from rice fields. Tomatoes were affected by drift from adjacent citrus trees which had been treated with small amounts of 2,4-D. Drift from treated grain fields and from weed control along drainage ditches and roadsides affected sugar beets and grapes. Lima beans and peaches were affected by drift of 2,4-D during airplane application to nearby fields. On the other hand, in some of the grape-growing areas where 2,4-D symptoms had been severe in former years, effects this year were either slight or nonexistent. In one case, a vineyardist complained that drift of 2,4-D was injuring his vines, and he requested an investigation be made to determine source of the material. Scattered symptoms were observed on the vines, and some plants of morning glory in the vineyard showed severe symptoms as if they had been sprayed. A partially emptied can of 2,4-D herbicide was found in the barn on the premises, and the evidence suggested that perhaps 2,4-D symptoms came from use of the chemical on the property rather than by drift from other properties. Reports were received that drift of 2,4-D had injured olive trees, but investigation failed to find any substantiating evidence.

Dieldrin appeared to be responsible for temporary illness of a mechanic who became wet with a spray mixture while repairing a spray pump on an airplane. He experienced severe nausea and dizziness several hours later and was taken to a hospital. This case is typical of several which have come to the attention of the bureau during recent years, and emphasizes the danger of working on equipment or storage tanks which contain residues of hazardous chemicals.

Sodium chlorate, mixed with sodium borates or with magnesium chloride as a fire suppressant, was widely used during the year as a defoliant for removing leaves

from cotton plants, just before harvest to facilitate picking. Such products are registered as economic poisons, and they are regularly sampled and analyzed. No irregularities were encountered. Several explosions were reported to have occurred in cotton gins, and there was widespread concern for possible fire hazards involved in using such mixtures. However, in some tests which were made, the flammability of filter paper strips or of raw cotton was not increased when these materials were treated with some defoliant mixtures in common use.

An airplane used to apply chlorate defoliants caught fire while standing alone on a landing field, but there was no evidence that the chemical was responsible. Particular concern was expressed over the possible danger of using chlorate products in spray rigs before or after using organic compounds. It is well known that strong oxidizing agents such as chlorates or hypochlorites are not compatible with either organic materials or any materials which are readily oxidizable; some such mixtures burn with explosive violence. The problem was complicated when it was reported that some farmers had made their own chlorate defoliants and may have omitted addition of a fire suppressant or not have used the proper proportions.

Reports of Loss

Section 160.96 of the Agricultural Code requires that any person suffering loss or damage from aircraft application of pesticides by others must file with the county agricultural commissioner a report of such loss within 60 days from the time that the loss became known to him. A total of 12 reports were filed for 1955, compared with 24 during 1954. Most of the cases involved 2,4-D.

Civil Suits

Although the bureau has no direct concern with civil suits for damages, such suits involve hazards in use of agricultural chemicals; they are, therefore, of general interest to all concerned with problems of pesticides and fertilizing materials. The bureau does not attempt to secure complete listing of such suits, but the following came to its attention during the year.

A user of a household pesticide dust sued for $165,000 for injury attributed to the material, but lost a jury verdict by 10 to 2. A ranch sued a pest control operator and a pesticide manufacturer for damage to pear trees attributed to traces of 2,4-D present as a contaminant in a DDT spray, and was awarded $16,000. A dairyman was awarded $887 and costs for loss of two dairy cows attributed to drift of TEPP during application by aircraft to an adjacent field. A sheep raiser sued an operator for loss of 80 sheep attributed to drift of sulfur dust from an adjacent field, and was awarded $2,100.

A farmer sued a fertilizer company for loss of young fruit trees. He had applied the fertilizer in the planting holes according to verbal instructions from the fertilizer manufacturer, and the trees had died. The case was settled out of court. A farmer sued an aircraft operator and a development company for damage to a carrot seed crop which he attributed to drift of 2,4-D, and was awarded $1,700. In another case, a farmer sued an irrigation district for damage to 60 acres of cotton which he attributed to drift of 2,4-D applied to irrigation ditch banks. The court held that a political subdivision cannot be sued.

NEW DEVELOPMENTS

Among the new pesticides appearing during the year were three chemicals for control of soil-infesting nematodes, dibromo chloropropane, dichlorophenyl diethylphosphorothioate, and sodium N-methyl dithiocarbamate, and three new herbicides, disodium monomethyl arsonate, trichlorophenoxy ethyl dichloropropionate, and aminotriazole.

Use of commercial fertilizers in liquid form continued to increase; they comprised an impressive 30 percent of the total tonnage during 1955. Sales of ammonia solutions with 20-0-0 analysis totaled 175,745 tons, which is approximately 18 percent of the total tonnage. Large tonnages were also reported for liquid mixed fertilizers, ammonium nitrate solutions, liquid phosphoric acid and anhydrous ammonia. Some interest was also shown in water-soluble commercial fertilizers suitable for application by means of sprinkler attachments and by addition to irrigation water.

Increased sales of commercial fertilizers

in liquid form focused attention on the problems of labeling the materials and on measurement of the amounts delivered. A series of meetings were held in various areas of California, at which requirements of law and acceptable methods of compliance were discussed with members of the industry. The Bureau of Weights and Measures explained that such liquid materials might be sold by net weight, by metering through an approved meter, or by full compartment, which is a tank gauged by a sealer. Measure of volume by a dipstick is not acceptable.

Several firms became interested in providing a lawn fertilizing service, wherein a tank truck of dilute liquid fertilizer is driven from house to house and the dilute material is sprayed on the lawn. Although charge may be based on the area of lawn sprayed if the operator chooses, the amount delivered must be shown in terms of volume. California law makes it unlawful to sell any commercial fertilizer or any agricultural mineral except in a lot properly labeled by, or a package filled and labeled by, a registrant, as provided in the law. This means that the operator providing such services must be a registrant or a bona fide agent of a registrant, unless some arrangement is made to bring the commercial fertilizer or agricultural mineral to each site in an unopened package filled and labeled by a registrant.

The trend continued toward pelletizing mixed commercial fertilizers as well as simples. Uniform pellet size minimizes segregation of components of mixed goods and facilitates application, particularly by aircraft.

SOIL AMENDMENTS

After defining commercial fertilizers, agricultural minerals, manures and auxiliary plant chemicals, the Agricultural Code classes all other fertilizing materials as soil amendments. Materials of greatly different compositions and uses are included in the class. The law does not require registration of soil amendments, nor does it require any specific labeling of such materials. The general provisions of law apply to them in prohibiting misrepresentation in connection with the sale of any fertilizing material. Inasmuch as agricultural minerals, auxiliary plant chemical and brand name commercial fertilizers must be registered before sale, the proposed labeling claims can be examined before they appear on the market, and misrepresentation can be forestalled. No such preliminary examination is required in the labeling of soil amendments, and corrective action cannot generally be undertaken until after misrepresentation has occurred. Furthermore, the claims made for some of the materials are so vaguely expressed and the uses so poorly known, that misrepresentation is difficult to apprehend and to correct.

The soil amendments most commonly encountered during the year may be roughly grouped into four kinds: (1) peat mosses and sedge peat; (2) lignite, lignaceous shale, and lacustrine deposits; (3) clays, scoria, pumice, and low-grade ores; (4) enzymes and biological products.

Peat mosses and sedge peat are not used in commercial agriculture in California, but large amounts are used by gardeners, nurserymen and florists. Hypnum peat moss is produced in Modoc County in Northern California. Sphagnum peat moss is imported mainly from Canada, and some supplies are imported from other foreign countries and other states. Sedge peat is produced in the delta of the Sacramento and San Joaquin Rivers in Central California. The three types of material differ in physical characteristics. Some products are sold by weight, some are sold by loose volume measurement, and some are sold by compressed volume measurement or in bales of various sizes. The importance or practical significance of the various characteristics is not established, although purchasers commonly are interested in the pH of the material, the amount of organic matter and the water-holding capacity. The labeling and advertising of these soil amendments is being discussed with interested persons to see what can be done to promote marketing in an orderly and informative manner.

Lignite, lignaceous shale and deposits from old lake beds are sometimes marketed as soil amendments. Reports have been made that such materials have improved the physical structure of compact, impervious soils and of sandy soils, thereby promoting plant growth. All the materials contain some organic matter, and it seems likely that any agricultural value they may have can be attributed to this component. Chemical analyses of these are apt to be more mis-

leading than helpful, as discussed in the next paragraph.

Clays, pumice, scoria and low-grade ores of various kinds frequently appear on the market as soil amendments. Few of the products are marketed for more than a season, but the new ones which appear each year to take the place of the abandoned ones present a continuing problem. The stories of their development are somewhat the same. The material "looks different" from common rock or soil, so a sample is taken to a commercial laboratory. The report of analysis shows that it contains 20 or more elements, some in large amounts, such as silicon, aluminum, iron and calcium; some in small amounts such as manganese, magnesium and titanium; and some in infinitesimal traces such as barium, vanadium, chromium and silver. All rocks and all soils show a similar array of elements, but to anyone not familiar with chemistry, the report on his material is an impressive document which seems to show that his material is an amazing blend of rare chemicals. No other use can be found for the seemingly unique material, so the belief develops that it provides an excellent correction for "mineralizing" agricultural soils. The problem is complicated by the fact that certain crops in some areas are benefited by addition of small amounts of elements other than the three classical fertilizer plant foods, nitrogen, phosphorus and potassium. Such examples of "deficiencies" are frequently caused not by a shortage of an element but by its unavailability to plants in that particular soil, and the problem is, therefore, further complicated by lack of a ready means of determining the availability to plants of elements in soils or in the minerals added to them. Some of the products proposed for marketing in California contain no significant amounts of nutrient elements. are valueless as commercial fertilizers or agricultural minerals and are, therefore, not acceptable for registration. Firms interested in their sale sometimes then market them as soil amendments, restricting claims to those appropriate for this class of fertilizing materials, such as claims that the materials improve the physical texture of compact, impervious soils. The claims acceptable for some of the materials do not seem to justify the prices charged for them.

A fourth type of soil amendment has developed during the past five years or so. It contains no significant amount of mineral substance or any known plant nutrient and sometimes is chemically undistinguishable from irrigation water. Claims are made for substances vaguely described as enzymes, catalysts, energizers, or biological activators, without further specification of what these are or what they do. Inasmuch as soil amendments need not be registered, their agricultural value need not be established before they are offered for sale. The law prohibits misrepresentation in connection with their sale, and investigations have been made from time to time to determine if any corrective action should be taken and could be substantiated. The claims are vague. There is no basis for objective evaluation of the agricultural value of the products. The testimony of users is conflicting. Some users believe the materials are of no value, some believe that they are of value, and some are unable to reach a conclusion.

AMOUNTS OF AGRICULTURAL CHEMICALS

In response to many requests for data on use of pesticides and fertilizing materials in California, the bureau develops such information from a number of sources.

Commercial fertilizers tonnage license tax data afford an accurate measurement of the kinds and amounts of such materials sold in the State. The data show sales of 976,160 gross tons during 1955, which is an all-time high. Each of the past six years has successively established a new record, and the total tonnage has doubled every 10 years. Segregated tonnage data, showing the tons of various commercial fertilizers and agricultural minerals and presenting other statistical information, were prepared for the years 1903-1954 and are available in a separate publication. The gross tonnage of commercial fertilizers sold in 1955 represented 195,400 tons of nitrogen, 68,200 tons of available phosphoric acid, and 16,100 tons of potash. Expressed in the more modern elemental terms, it represented 29,800 tons of phosphorus and 13,400 tons of potassium. Assuming certain approximate sales prices for each of the segregated items, the tonnage in 1955 reflected sales totaling $85,000,000.

Agricultural minerals during 1955 totaled 695,972 tons, which is less than the record tonnage of 817,255 tons reported for 1952.

TABLE 1

Acreages Treated for Agricultural Pest Control, by Counties in 1955

Reported by Agricultural Pest Control Operators

	By aircraft			By ground equipment				Total sprayed	Total dusted	Total treated by operators	Total treated by farmers (estimated)	Total acreage treated (estimated)
	Spray	Dust	Total	Spray	Dust	Other	Total					
Fresno	242,093	240,624	482,717	22,890	13,537		36,427	264,983	254,161	519,144	1,208,867	1,728,011
Kern	687,557	331,316	1,018,873	29,020	1,792		30,812	716,577	333,108	1,049,685	275,100	1,324,785
Imperial	816,974	173,322	990,296	21,176	8,077		29,253	838,150	181,399	1,019,549	70,000	1,089,549
Tulare	216,486	145,142	361,628	80,561	16,725		97,286	297,047	161,867	458,914	4,589	463,503
Riverside	174,945	78,305	253,250	51,588	2,097	2,847	56,532	226,533	80,402	309,782	61,000	370,782
San Joaquin	36,224	196,048	232,272	19,013	2,311	1,862	23,186	55,237	198,359	255,458	59,000	314,458
Monterey	23,760	65,189	88,949	133,951	14,753	3,214	151,918	157,711	79,942	240,867	28,300	269,167
Santa Clara	2,534	31,190	33,724	9,815	4,602	66	14,483	12,349	35,792	48,207	220,000	268,207
Los Angeles	74,497	3,618	78,115	45,901	3,960		49,861	120,398	7,578	127,976	130,000	257,976
Kings	115,411	62,006	177,417	18,350	708		19,058	133,761	62,714	196,475	8,167	204,642
Stanislaus	41,617	95,041	136,658	5,751	1,859	7,144	14,754	47,368	96,900	151,412	27,000	178,412
Ventura	25,433	34,503	59,936	84,936	15,154	10,710	110,800	110,369	49,657	170,736		170,736
Yolo	58,771	53,648	112,419	15,438	1,516		16,954	74,209	55,164	129,373	23,000	152,373
Santa Barbara	47,778	26,171	73,949	33,918	9,948	1,349	45,215	81,696	36,119	119,164	18,500	137,664
Sacramento	15,172	26,080	41,252	9,785	1,242	740	11,767	24,957	27,322	53,019	52,000	105,019
Madera	56,682	38,496	95,178	1,624	1,000	141	2,765	58,306	39,496	97,943		97,943
Orange	10,918	9,417	20,335	44,880	6,023	1,505	52,408	55,798	15,440	72,743	24,850	97,593
Sonoma	2,411	3,449	5,860	3,856	1,670		5,526	6,267	5,119	11,386	85,950	97,336
Merced	35,985	49,998	85,983	1,146	154	451	1,751	37,131	50,152	87,734		87,734
Colusa	64,428	15,124	79,552	4,357			4,357	68,785	15,124	83,909		83,909
Sutter	48,434	29,061	77,495	1,145			1,145	49,579	29,061	78,640		78,640
Placer	4,024	653	4,677	329			329	4,353	653	5,006	72,199	77,205
Lake	698	12,108	12,806	9,683	767		10,450	10,381	12,875	23,256	48,000	71,256
San Luis Obispo	41,829	7,532	49,361	3,172	2,693	396	6,261	45,001	10,225	55,622	15,448	71,070
Napa	2,121	579	2,700	3,459	17		3,476	5,580	596	6,176	62,700	68,876
Butte	33,678	1,472	35,150	4,594	1,183		5,777	38,272	2,655	40,927	24,800	65,727
San Benito	12,268	9,685	21,953	6,613	604	2	7,219	18,881	10,289	29,172	27,930	57,102
San Bernardino	6,507	1,739	8,246	42,098	3,515	2,704	48,317	48,605	5,254	56,563		56,563
Glenn	46,122	109	46,231	10,070			10,070	56,192	109	56,301		56,301
Alameda	2,346	12,826	15,172	517	209		726	2,863	13,035	15,898	25,700	41,598
Contra Costa	13,026	20,399	33,425	5,169	996	128	6,293	18,195	21,395	39,718		39,718
San Mateo	2,927	2,402	5,329	66		2	68	2,993	2,402	5,397	34,000	39,397
Solano	10,229	8,385	18,614	5,340		32	5,372	15,569	8,385	23,986	10,082	34,068
San Diego	14,990	3,450	18,440	6,821	836	1,356	9,013	21,811	4,286	27,453		27,453
El Dorado	213		213	3,045			3,045	3,258		3,258	21,000	24,258
Modoc	19,492	836	20,328	1,236			1,236	20,728	836	21,564		21,564
Siskiyou	17,701		17,701	961			961	18,662		18,662		18,662
Santa Cruz	4,190	5,623	9,813	5,067	439	71	5,577	9,257	6,062	15,390		15,390
Yuba	5,435	6,176	11,611	1,084		13	1,097	6,519	6,176	12,708		12,708
Tehama	9,584	645	10,229	247			247	9,831	645	10,476		10,476
Mendocino	58	119	177					58	119	177	5,557	5,734

Marin	3,482		3,482	612			612	4,094		4,094		4,094
Shasta	1,850		1,850	711			711	2,561		2,561	326	2,887
Del Norte				271			271	271		271	756	1,027
Amador	96		96					96		96	297	393
Lassen				68			68	68		68		68
San Francisco				25			25	25		25		25
Totals	3,050,976	1,802,486	4,853,462	750,359	118,387	34,733	903,479	3,801,335	1,920,873	5,756,941	2,645,118	8,402,059

TABLE 2

Acres of Each Crop Treated by Pest Control Operators in 1955

	Aircraft			Ground				Total sprayed	Total dusted	Total treated by operators
	Spray	Dust	Total	Spray	Dust	Other	Total			
Field Crops										
Cotton	1,016,447	643,023	1,659,470	51,322	4,137	34	55,493	1,067,769	647,160	1,714,963
Alfalfa, Clovers	934,901	190,582	1,125,483	48,170	1,438	3,096	52,704	983,071	192,020	1,178,187
Rice	180,602	13,524	194,126					180,602	13,524	194,126
Other Grains	303,201	11,405	314,606	48,684	282	2,178	51,144	351,885	11,687	365,750
Beans	42,249	79,437	121,686	5,631	4,136	1,281	11,048	47,880	83,573	132,734
All other field crops	96,308	54,391	150,699	19,302	2,672	451	22,425	115,610	57,063	173,124
Total field crops	2,573,708	992,362	3,566,070	173,109	12,665	7,040	192,814	2,746,817	1,005,027	3,758,884
Vegetables										
Potatoes	152,501	123,893	276,394	6,515	9,251	501	16,267	159,016	133,144	292,661
Tomatoes	34,429	217,189	251,618	963	5,863	152	6,978	35,392	223,052	258,596
Lettuce	56,630	52,714	109,404	105,489	20,147	70	125,706	162,179	72,861	235,110
All other vegetables	57,878	132,234	190,112	50,180	15,418	10,133	75,731	108,058	147,652	265,843
Total vegetables	301,498	526,030	827,528	163,147	50,679	10,856	224,682	464,645	576,709	1,052,210
Subtropical fruits	8,535	8,050	16,585	266,828	7,773	1,446	276,047	275,363	15,823	292,632
Grapes	4,796	138,394	143,190	22,940	22,860		45,800	27,736	161,254	188,990
Deciduous fruits	20,004	77,381	97,385	58,569	11,163	83	69,815	78,573	88,544	167,200
Nuts	8,644	13,672	22,316	34,709	3,729		38,438	43,353	17,401	60,754
Range and Pasture	26,470	1,358	27,828	14,065			14,065	40,535	1,358	41,893
Berries	248	19,832	20,080	458	900	166	1,524	706	20,732	21,604
Flowers, Ornamentals	2,252	9,933	12,185	828	531	70	1,429	3,080	10,464	13,614
Miscellaneous	104,821	15,474	120,295	15,706	8,037	15,072	38,865	120,527	23,561	159,160
Total treated by operators	3,050,976	1,802,486	4,853,462	750,359	118,387	34,733	903,479	3,801,335	1,920,873	5,756,941

The total sales value was approximately $6,800,000. As always, gypsum accounted for more than 80 percent of the tonnage, but much of it sells for a low price; cost of gypsum to the farmer was estimated at $3,400,000.

Manures are sold in both the farm and the garden trade. No accurate data are available on the total amounts used, but it has been estimated that the total retail value of bagged manure in the Los Angeles area is approximately $3,500,000. This is largely sold in the garden trade. No estimates have been made of the amounts of bagged manure sold elsewhere in the State nor of the amount of unbagged manure sold in the farm trade.

Peat and peat moss are classed as soil amendments. No accurate information is available on the amounts used in the State, but some informed persons estimate the value at $5,000,000. This is sold for commercial floriculture, ornamental plantings and the garden trade. It is not used in commercial agriculture.

No estimates have been made of the sales value of other **soil amendments** nor of **auxiliary plant chemicals,** but the total is known to exceed several million dollars. Thus the total amount spent annually in California for fertilizing materials greatly exceeds $100,000,000.

No accurate data are available on the amounts or sales value of **pesticides** used in California. A survey published in 1955 by the United States Department of Agriculture on the extent and cost of spraying and dusting on farms during 1952 indicated that farmers in California spent approximately $16,000,000 for pesticides, another $34,000,000 for pesticides plus application by agricultural pest control operators for control of weeds, insects and disease in farm crops and land, and insects and disease in livestock, barns, and shelters. These figures total approximately $50,000,000, which is approximately one-fifth of the national total. The figures do not include money spent by farmers for pesticides such as wood preservers, rodenticides, seed treatments, defoliants, or materials for control of nematodes, no estimate has been made of the amount of pesticides used in households, gardens, parks and greens; restaurants, bars, barber shops, dairies, structural pest control, mosquito abatement, or industrial uses such as soil sterilization, preservation of poles, timbers and fish nets, antifouling paints and mildew-resistant paints, and mill fumigants. The importance of the **agricultural pest control business** in California is indicated by the fact that 30 percent of all money paid by farmers in the United States to agricultural pest control operators for services plus pesticides is spent in California.

The **acreage treated** for agricultural pest control continues to increase each year. Agricultural pest control operators submit monthly reports to the agricultural commissioner of each county in which they work, showing the work done in that county. Table 1 shows some of the data secured in this manner. In addition it shows an estimate, made by the commissioner, of the acreage treated by farmers themselves for agricultural pest control in each county. All these figures are acre-treatments. For example, a 50-acre field treated three times would be recorded as 150 acres treated. The figures show that farmers treat 31 percent of the total acreage treated, and agricultural pest control operators treated 69 percent, using aircraft on 58 percent and ground application on 11 percent of the acreage. The total acreage treated for agricultural pest control by aircraft in California has increased tremendously from the 65,479 acres, reported for 1934, to 4,853,462 acres for 1955. These figures do not include use of aircraft in application of seed or fertilizer, or for other agricultural purposes. Much of the increased acreage reported in 1955 reflects treatments of alfalfa for spotted alfalfa aphid. The acreage of alfalfa and clover treated by aircraft jumped from 410,452 acres during 1954 to 1,125,483 during 1955. Table 2 shows that cotton accounts for the largest portion of the acreage, and with alfalfa and clover these field crops account for half of the acreage treated by aircraft.

Bureau of Entomology

H. M. ARMITAGE, *Chief* [1]
R. W. HARPER, *Assistant Chief, Acting in charge*

The Bureau of Entomology provides six basic services: state-wide surveys to detect the presence or spread of new insect pests; taxonomic facilities to identify insect species involved; eradication projects to eliminate incipient infestations of introduced pests of major concern; control programs to minimize attack of insects which do not lend themselves to individual grower effort; advisory assistance to agricultural commissioners in meeting miscellaneous pest control problems of a local or quarantine nature; and supervision of apiary inspection in support of local regulatory duties.

INSECT PEST DETECTION SURVEY [2]

Specific state-wide detection surveys, in cooperation with the county agricultural commissioners, were continued for pink bollworm, Japanese beetle and Mexican fruit fly. The European corn borer, Oriental fruit fly and sweet potato weevil are other major insect pests, not known to be present in California, for which detection surveys have been conducted as a county responsibility. Extensive specific state-county detection survey has also been made for the pear psylla, walnut husk fly, wheat sawfly, spotted alfalfa aphid and the Khapra beetle. Surveys of a more general nature were also made in cooperation with county commissioners in order to be alert to the presence of any new insects of possible economic importance in California.

Pink Bollworm, *Pectinophora gossypiella*

The annual survey to detect possible presence of the pink bollworm was again conducted in cooperation with the Federal Pink Bollworm Control Project and agricultural commissioners of California cotton-producing counties. Though now known as the most important world-wide pest of cotton, this insect has never been found established in California. It is, however, frequently intercepted at border quarantine stations and is believed to be potentially the most serious insect pest threat to the production of cotton in California. Survey methods are based on experience gained in infested states, where inspection of first cleaner trash from gins has proved the most practical and effective method of detecting extremely light populations of the pink bollworm.

For this type of inspection, samples, preferably of first cleaner trash, are obtained from as many gins as possible in each county and brought to a central location, where they are processed through an inspection machine designed specifically to separate out any pink bollworms which may have been shaken out of the seeds as the bolls pass through the cleaners. Although the exact location from which these samples originate is not known, methods of harvest are such that each bushel sampled probably contains trash from several acres and constitutes a representative sample from a given field.

Prior to 1952, one or more gin trash machines were brought from Texas each year by a federal crew and operated with state and county participation. Since 1952, when five of these inspection machines were loaned to the state, inspections have been made by state and county personnel only. The federal equipment loaned for the 1955 season consisted of five machines of an improved design, mounted on trailers and pulled by pickup trucks which were also available for collecting and hauling gin trash.

Due to the late start in cotton picking, gin trash inspections were not initiated in the San Joaquin Valley until October 17th and completed November 23d, when one machine was taken to Riverside County and

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one to Imperial County; both machines completed the final week of inspection in Imperial County December 16th. Despite the shorter period of inspection during 1955, 20,877 bushels of gin trash were collected and inspected from 134 of the 215 ginning locations throughout California cotton-growing areas, compared to 25,977 bushels of trash inspected during 1954. This inspection was distributed throughout the counties as follows: 2,718 bushels from 47 gins in Fresno County; 4,110 bushels from 17 gins in Kern County; 3,919 bushels from 15 gins in Kings County; 1,675 bushels from 14 gins in Madera; 560 bushels from six gins in Merced County; 3,714 bushels from 19 gins in Tulare County; 2,615 bushels from 11 gins in Imperial County; and 1,566 bushels from five gins in Riverside County. For these inspections state personnel contributed 2,471 man-hours and the counties 1,626 man-hours. No pink bollworms were found in any inspected trash which had been taken from a well distributed and comprehensive sampling of 743,000 acres of cotton planted in California during 1955. A federal crew made gin trash inspections in the Imperial Valley of Baja California and adjacent Arizona cotton plantings in late November and December. As in California, no pink bollworms were found.

As a supplement to the gin trash inspections, field inspections of cotton bolls were made in six California counties as follows: 44,600 bolls from 841 fields in Fresno County; 5,000 bolls from 50 fields in Kings County; 7,600 bolls from 76 fields in Madera County; 6,700 bolls from 67 fields in Merced County; 200 bolls from two fields in Riverside County; and 850 bolls from three fields in San Bernardino County. This total of 64,950 bolls compares with 79,840 bolls cut and examined from 11 counties during 1954. In making these inspections the State contributed 505 man-hours and the counties 1,215 man-hours, of which 992 were contributed by Fresno County. At the invitation of the Director of Nevada's Division of Plant Industry, an inspector from California participated during September with state and federal representatives in the examination of of 2,400 cotton bolls from 16 fields in Nye County where cotton from 2,200 planted acres was to be ginned in California. One hundred bolls were also inspected from a single small planting in Clark County. No indication of pink bollworm was found in any of the bolls examined in either California or Nevada.

Japanese Beetle, *Popillia japonica*

Six hundred fifty-eight of the federal Japanese beetle detection traps, baited with anethole-eugenol as a lure, were placed out and serviced during the period from May 1st to August 30th. All traps were distributed by the State and serviced at weekly intervals by county commissioners. No Japanese beetles were taken in any of the traps operated during the 1955 season.

Airports which receive long distance flights from infested areas are considered a major hazard, particularly the International Airport at Los Angeles where 70 traps were serviced by state and county personnel from May 1st to August 30th. Because of many cross-country flights terminating in the San Francisco Bay area, 28 traps were placed in areas surrounding the San Francisco International Airport, San Mateo County, and 39 in the East Bay areas in Alameda County. Ten traps were placed at Moffet Naval Air Station, Santa Clara County, and six at Travis Air Force Base, Solano County.

Traps were also located at other military and civilian airfields in Sacramento, San Joaquin, Merced, Riverside, San Bernardino and San Diego Counties. Los Angeles County had a total of 315 traps, and Orange County had 80 in operation in a well distributed pattern.

Since 1937 when state-county trapping was first inaugurated, only two beetles have been taken, during July, 1951, and June, 1954; both were captured in traps located in the approach area to the Los Angeles International Airport. The fact that none were taken during 1955 confirms the opinion that these beetles were escapes from incoming airplanes and did not originate in an established infestation.

Wheat Sawfly, *Pachynematus sporax*

Damage by this leaf-feeding sawfly was first reported by the Commissioner of Santa Barbara County from a single wheat field near Cuyama, April, 1951. By 1953 increased infestation completely destroyed 200 acres of wheat. It was not, however, until March, 1954, that adults were observed and identified as a species not previously known in California. At that time swarms of adults observed emerging in the area led to a survey which indicated outward dispersal to include an irregular area approximately 12 miles long and from two to six miles wide in the Cuyama Valley, Santa Barbara and San Luis Obispo Counties, within which were 12,075 acres planted to wheat. In view

of the outward spread each year and the threatened loss of several thousand acres during 1954, a suppressive control was authorized to reduce existing populations and restrict outward spread pending development of additional information sufficient to justify an eradication program.

In order to detect any dispersal to new areas and to make observations within the known infested area as a basis for timing the two airplane spray applications authorized for 1955, 429 man-hours inspection were made by the State and 224 hours by the counties participating during March. Only one field outside of the control area established in 1954 was found infested.

Survey was expanded to include inspections of 21 fields on the Carriso Plains of San Luis Obispo County, where 75,000 acres of wheat were growing, separated from the Cuyama Valley only by a low mountain range; 71 fields in Monterey County; four in Kern County; and 15 in Ventura County. No indication of wheat sawfly was found in any of these areas. In the Cuyama Valley adults were first observed March 15th; by the end of the month they could be found readily, but not in large numbers, in three fields where infestation had been heaviest during 1954. Elsewhere they were exceedingly scarce. Observations revealed eggs in volunteer wheat plants and in two species of grass, identified as *Orizopsis hymenoides* and *Elymus triticoides*. Thorough search in surrounding areas failed to indicate oviposition in either of these grasses, except immediately adjacent to wheat.

Spot observations following the first treatment through the entire control area revealed live larvae in only one field at Ven-

Wheat sawfly, *Pachynematus sporax* (Ross), adult on wheat leaves

Wheat sawfly, *Pachynematus sporax* (Ross), larva feeding on a wheat leaf

tucopa, where five live larvae were taken with a sweep net in a corner of one field. Not a single wheat sawfly larva was found following the second treatment. It is reasonable to expect, however, that some larvae could have survived or that some of those in the ground may not have transformed to adults this year. In view of this, intensive state-county survey will be made again during 1956; two suppressive sprays are authorized.

Pear Psylla, *Psylla pyricola*

Following the commissioner's report of a pear psylla infestation in Potter Valley, Mendocino County, a state-county survey of pear plantings in surrounding counties was made immediately. Nineteen commercial orchards inspected in Lake County at the time revealed no signs of psylla. The commissioner, however, who had previously inspected isolated plantings in that area of Lake County near Potter Valley, continued inspections of all commercial plantings in the county. The only indication of pear psylla found was a light incipient infestation on a small planting of one-half acre in Scott Valley, which was immediately sprayed.

During a three-day July survey by state and county inspectors, in Humboldt County, 38 properties containing pear trees were inspected. Most were yard or roadside trees

Wheat sawfly, *Pachynematus sporax* (Ross), adult specimens, at the left, female, and right, male

or old farm plantings; small orchards were also inspected at Willow Creek, Shively and Camp Grant. Light infestations apparently of recent development were found on 16 properties in an area extending from Prairie Creek on the north to Philipsburg on the south. Only first instar nymphs were found in several localities. None were found south of Philipsburg. The only previous report of infestation was based on a collection submitted from Orick in 1953. Presence of an infestation at Orick was not confirmed by the commissioner either during 1953 or 1954; a thorough search again failed to indicate infestation on the two trees at the suspected Orick property.

Inspections at Burnt Ranch, Trinity County, showed two small nymphs on one tree, a first record for that county. Two nymphs found on pear trees at a Soda Creek Road property close to the north boundary of Shasta County revealed an incipient infestation there for the first time.

State-county survey of Amador, El Dorado, Glenn, Napa, Placer, Sacramento, Sonoma and Yolo Counties failed to indicate any pear psylla infestation. Neither was any infestation found in a four-acre orchard at Covelo in northern Mendocino County. In these joint surveys, 102 man hours were contributed by the State and 90 by the counties in the inspection of 1,500 trees on 115 properties, an estimated total of 1,500 acres of commercial plantings. The Commissioner of Solano County reported inspection of 16 properties, 2,100 acres of the total 2,600 planted in the county; no indications of pear psylla were found.

The appearance of incipient infestations at widely separated points in Humboldt, Trinity and northern Shasta Counties may well be the result of natural flight or wind drift from areas in Siskiyou and Del Norte Counties known to be infested since 1953; however, the gap of some 75 miles between the southern-most incipient infestations in Humboldt County and the heavy infestation in Potter Valley suggests the possibility of a carry-in. Dispersal from the Potter Valley to commercial plantings in Lake, Sonoma and Napa Counties will probably occur during 1956.

Walnut Husk Fly, *Rhagoletis completa*

The first finding of this insect in walnuts in Northern California was reported in November, 1954, too late to permit an adequate survey at that time. The circumstances of the collection of maggots in one small orchard near Sonoma provided evidence that the infestation was widespread in that area. Therefore, a state-county cooperative trapping survey was initiated during June and continued through September, to determine the extent of the infestation in the Sonoma County area and to detect possible presence of the insect in other Northern California localities. Two types of traps were used; first, the standard bait pan with a glycine-lye solution in water, which has been used for many years as a method of timing emergence in walnut groves; and secondly, the sticky-carton trap baited with powdered ammonium carbonate as a lure, which has proved very satisfactory for trapping the cherry fruit fly. Tested in comparison with the liquid pans at Sonoma and at Riverside by the Citrus Experiment Station of the University of California, these sticky traps proved to be effective; for detection purposes only they have many advantages. On residential properties, along roadsides and fields, they are not usually disturbed and do not necessarily have to be serviced and inspected at fre-

quent intervals. Bait pans require servicing and inspection at least once each week.

Husk flies were first caught July 12th in bait pans which had been in service at the infested orchard near Sonoma since June 24th. Additional bait pans were immediately placed in this area; during late July and August this type of trapping was extended to adjacent areas and to surrounding counties. A total of 302 bait pans were placed on 129 properties in 13 counties: 78 pans were in Sonoma County, and 55 in San Joaquin County. During late August and early September, 1,235 of the sticky-carton traps were placed on 440 properties in 17 counties extending from Stanislaus and San Benito northward to Shasta County. Included were 40 of the sticky traps in widely separated points in Kern County. Three counties, Marin, Napa and Sonoma, had both bait pans and sticky traps; a total of 1,527 traps were placed in 28 counties.

Capture of flies near Sonoma continued until midsummer in both liquid and sticky traps. Infestation appeared to center along the Sonoma Creek, from Boyes Springs south through El Verano for a distance of about four miles; a few flies were captured in the town of Sonoma and near Kenwood. During September a single fly was taken in a sticky trap located four miles north of Kenwood. At the same time a single fly was taken in a sticky trap located on Highway 12, three miles east of Shellville and less than a mile from the Napa County line. This would indicate an infested area through the narrow Sonoma Creek Valley for a distance of approximately 20 miles.

No walnut husk flies were captured in any traps outside this area, except in Kern County. A trap in a walnut tree at Frazier Park caught a single fly during September, and maggots were found in the nuts there at harvest. This location is near Tejon Pass, almost at the Los Angeles County boundary and presumably a natural extension of the infested area in Los Angeles and Ventura Counties. None were taken elsewhere in Kern County. The commissioner of Santa Barbara County reports five of the liquid traps in operation during the season, but no capture of flies.

Mexican Fruit Fly, *Anastrepha ludens*

Since August 1, 1954, the trapping survey to detect possible presence of the Mexican fruit fly in California has been conducted by the Mexican Fruit Fly Project of the United States Department of Agriculture, along a 10-mile zone adjoining the international boundary in Imperial and San Diego Counties and at Yuma, Arizona. North of this zone the trapping has been conducted by county agricultural commissioners. Within the boundary zone, federal workers report a maximum of 1,659 traps in operation in San Diego County; 77,964 trap inspections were made during 1955. In Imperial County, 14,339 trap inspections were made of 333 traps in operation. At the end of the year, 1,992 traps were in operation throughout the zone in San Diego and Imperial Counties on 406 individual properties. Outside of this border zone, the commissioners report a maximum of 216 traps in San Diego County and 7,502 trap inspections during 1955; a maximum of 102 traps in Orange County and 4,924 inspections; 98 traps in Riverside and 5,978 inspections; 100 traps in Los Angeles and 3,164 trap inspections; 102 traps in San Bernardino and 3,164 inspections. Orange, Riverside and San Diego operated the traps throughout the year. Los Angeles County operated all traps from April 1st to October 31st, and 18 traps for the balance of the year. San Bernardino County operated the traps from April 1st to September 30th. All traps have been of the McPhail glass type, baited with a solution made by dissolving six pounds of brown sugar in five gallons of water.

No Mexican fruit flies were captured in any traps operated in California during 1955; however, a single male fly was captured in one of the United States Department of Agriculture traps at Tecate, Baja California, in close proximity to the international boundary. The only capture of a Mexican fruit fly in California was made in a trap at San Ysidro, August 9, 1954.

Khapra Beetle, *Trogoderma granarium*

Early in 1955, survey entomologists continued inspections, in cooperation with federal and county inspectors, which had been carried on during the latter months of 1954. Attention had largely been given to the large distributing and wholesale plants, although inspections were also made in mixing plants, feed stores and large feed yards which might have stored grain. As a result of this combined effort, 57 premises in 10 counties were known to be infested at the beginning of 1955. Nearly all were important distributing and wholesale plants.

On January 26th, a survey entomologist working with a county inspector found a Khapra beetle infestation in a cooperative

warehouse at Williams, Colusa County, which was the first infestation found north of Madera and San Francisco. Sacked grain shipments from this warehouse to other Northern California points were traced; subsequent inspections by survey and county inspectors showed four additional infestations in Colusa County, three in Glenn County, three in Butte County, one in Sutter and two in Alameda County. County inspection of properties receiving grain from this source at the time also resulted in the finding of four infested properties in Lake County and 12 additional properties in Colusa.

As a result of state and federal quarantines, inspection and survey were greatly increased by the counties. A program, begun after July, with the objective of reaching every farm premise, was carried on largely by federal and county inspectors.

State survey entomologists continued to work with county teams when requested, particularly inspectors new to this type of survey. They have also been called on at times to make periodic inspections of quarantined properties pending release. The federal report to December 31st lists a cumulative total of 23,438 initial and 5,131 repeat inspections since November, 1953, during which 223 infestations have been found; 166 of these infestations were found during 1955. Nearly all premises found infested after July 1st were small on-farm storage for direct feeding or planting.

The extent to which counties have contributed is indicated by reports submitted by 42 counties, which list 28,778 man-hours devoted to inspection of 13,740 properties during 1955. These same counties report 18,333 hours devoted to all other insect surveys combined.

Spotted Alfalfa Aphid, *Therioaphis maculata*

This insect, first reported as the yellow clover aphid in San Diego, February, 1954, had spread to all Southern California counties by the end of the year. In the course of state-county survey, evidence of incipient infestation was first found in Edison, Kern County, January 1, 1955, and Ventura County during February. Survey at this time did not reveal infestations in other sections of Kern County or farther north. By May, heavy infestations were present in some fields and along roadsides in the Edison district, but were not found in the extensive plantings of the Shafter and Pozo districts. Light infestations, until June, were observed in the Fillmore district, Ventura County; after June, a tremendous spread occurred which reached Shasta County late in the year.

Therioaphis maculata, Spotted alfalfa aphid females feeding on an alfalfa stem

Oriental Fruit Moth, *Grapholitha molesta*

In cooperation with commissioners and the University of California Agricultural Extension Service, 73 Oriental fruit moth traps baited with dimalt were placed in five orchards outside heavily infested spots found near Kingsburg and Exeter during 1954. Heavy moth emergence was reported again in these areas, although damage was largely avoided by spray recommendations. Light infestations were detected in three of the outlying trap locations, one at Tagus, 20 miles from the Kingsburg infestation. The first San Benito County finding of the Oriental fruit moth on a single property in Hollister by the commissioner is perhaps indicative of eventual dispersion of this insect in Northern California localities. Inspection of 400 acres is reported, but no additional finds.

European Corn Borer, *Pyrausta nubialis*

The finding of two live larvae of the European corn borer during January, within a piece of corrugated paper along a railroad siding at Placentia, points again to the continued threat posed by this insect. This find was made by an Orange County inspector. The commissioner began immediately to inspect thoroughly all corn plantings in the immediate vicinity; he later surveyed 530 properties in the county; no additional corn borer larvae were found. All facts indicated these two larvae had been brought into the county in a car once used for corn shipment in an infested area of the Middlewest. Both Riverside and Los Angeles Counties report surveys for this insect in green corn. Los Angeles, San Bernardino and Riverside report placing a total of 80 traps in the vicinity of mills handling corn from the Middlewest.

Oriental Fruit Fly, *Dacus dorsalis*

Trapping on a state-wide basis was discontinued after the 1952 season, but traps and methyl-eugenol lure have been furnished to any commissioner who decided to continue trapping. During the present season, Orange, Riverside and San Bernardino Counties report a total of 118 traps during the summer months. No Oriental fruit flies were captured.

Cherry Fruit Fly, *Rhagoletis cingulata*

In cooperation with the counties, sticky-carton traps baited with powdered ammonium-carbonate were again placed in several Central California counties: Alameda, Contra Costa, Napa, Solano and Sonoma, 25 each; San Joaquin and Santa Clara, 75 each. No cherry fruit flies were captured.

Blue Grass Aphid, *Rhopalosiphum poae*, and the Apple Grain Aphid, *R. fitchii*

A survey entomologist visited the Tehachapi area during April, following a report by the commissioner that heavy populations of aphids were causing serious damage to Merion blue grass fields grown for seed. Two species of aphids, *R. poae* and *R. fitchii*, were identified from collections submitted. The occurrence of the blue grass aphid at Tehachapi is the first identification of this species in California. It may be more widespread but not recognized because of a close resemblance to the common apple grain aphid. Mixed populations of aphids were identified in collections submitted from three of the fields. Collections from one of the fields contained only the apple grain aphids. Slightly more than 100 acres were planted to Merion blue grass for seed at Tehachapi. It was growing in clumps in rows and heavily fertilized, producing a succulent condition favorable to aphids which were present in enormous numbers with many of the clumps sticky with honeydew. Dead clumps were scattered through the field. It was thought at first that these had been killed by aphids. A number of clumps were dug up and all showed feeding injury due to a caterpillar, identified as the glassy cutworm, *Coymodes devastator*, working at or just below the ground.

ERADICATION OF INCIPIENT INFESTATIONS OF NEW INSECT PESTS

MEREDITH JONES, *Economic Entomologist*

Major insect pests of important agricultural crops, now subject to eradication or suppression measures, include Mexican bean beetle, Mexican fruit fly, cherry fruit fly, citrus white fly, Khapra beetle, Hall Scale, Western grapeleaf skeletonizer, wheat sawfly and walnut huskfly. Each such project with year-around status is under direct supervision of a resident State entomologist or, if seasonal in nature, under direction of specifically assigned personnel. One project, Mexican bean beetle eradication, was successfully terminated; while a major Khapra beetle suppression campaign was in augurated. Holding action against the Western grapeleaf skeletonizer was modified, all field treatment operations being dropped.

Mexican Bean Beetle, *Epilachna varivestis* [3]

Following nine and one-half years of intensive effort and expenditure of $981,352, eradication of an infestation of Mexican bean beetle, *Epilachna varivestis*, in Santa Clara Valley, Ventura County, has been accomplished.

This conclusion is supported by the fact that following a carefully planned and well

[3] Ted Gallion, Entomologist in Charge.

executed treatment program, intensive survey of all bean plantings within Ventura and immediately adjacent counties during the five and one-half years since the last finding of a living specimen, July 27, 1950, has failed to show any survivors in any stage. The life history of the beetle is such that had there been any survivors they would have increased in numbers within the five-year survey period so as to be readily detectable by the measures employed.

Over the period of the project, the eradication effort involved close inspection of 741,483 acres of planted beans; infestations recorded on 65 ranch properties and 32 backyard gardens represented a total of 3,462 acres. As a result, 4,064,717 pounds of one percent rotenone were applied to 96,435 acres representing all plantings of beans within a one-mile radius of any infested property and including such property. With respect to each specific infestation, control measures were carried out over a continuous three-year period.

By actual count only 666 adult beetles, 1076 larvae and 168 egg masses were found following reduction of the heavy initial infestation of 1946. Of the money expended, $879,974 was provided by the State, $93,378 by the County of Ventura and $8,000 by the Ventura County Bean Growers Association.

This accomplishment is of major importance to the growers of both fresh and dry beans throughout California. Beans are a major crop in California, averaging 300,000 acres annually, which in 1954 returned $54,494,000 to the growers. The bean beetle, rated the number one pest of beans throughout the eastern United States, is often responsible for total crop loss. Once permanently established, it is both difficult and expensive to control. Total cost of its eradication in California was roughly less than two percent of returns from beans to the growers for a single year.

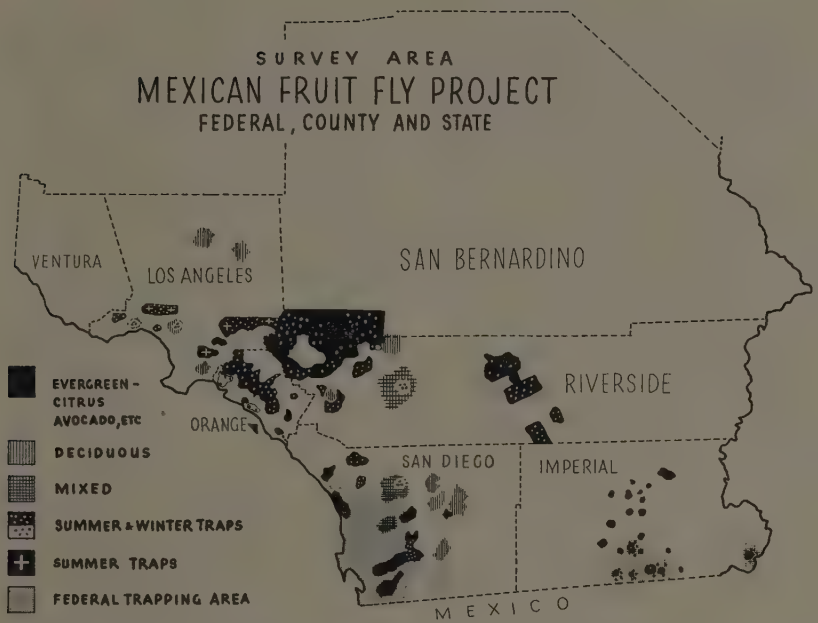
Eradication is the result of cooperative effort on the part of state, federal and Ventura County officials. The program was devised and primarily financed by the State; federal authorities developed and furnished needed biological and control information; the County Agricultural Commissioner, C. J. Barrett, furnished considerable direct field supervision for various phases of the program and substantial survey assistance.

Mexican Fruit Fly, *Anastrepha ludens*[4]

Intensive suppression measures, inaugurated during 1954 when an adult Mexican fruit fly, *Anastrepha ludens*, was found in Tijuana, Baja California, were continued during 1955. The over-all cooperative federal-state-county program includes two distinct operations, survey and treatment. The United States Department of Agriculture performs both activities in Baja California, Mexico, and also extensive detection surveys in the two southernmost California counties. The State Department of Agriculture is responsible for maintenance of a protective barrier of insecticide along the southern borders of San Diego and Imperial Counties, and an intensive and continuous trapping and fallen-fruit destruction program in the town of San Ysidro, San Diego County, where a single fly was taken, August, 1954. Five Southern California counties are servicing McPhail fruit fly traps on a 12-month basis and seasonally are examining selected fruit for larval infestation.

Based upon recommendations of the United States Department of Agriculture Research Laboratories in Mexico City, a change from tartar emetic-sugar to malathion-hydrolyzed yeast bait-sprays was made in mid-February. This formulation, eight pounds of 25 percent wettable malathion plus two pounds hydrolyzed yeast in 100 gallons of water, is applied as a spot spray. A new type of spray gun, developed by project personnel, made it possible to apply the spray inside the canopy of the host on the undersurface of the leaves, in accordance with recommendations. Spray applications in both San Diego and Imperial Counties continued on a routine basis throughout the year, but was suspended in the latter area during the three summer months, July through September. A total of 12 complete ground applications was made to the Calexico protective zone during the year. In the nine months of operations, the ground crew applied 8,047 gallons of bait to 91,392 hosts on 8,456 properties, using an average of 0.088 gallon per host. A total of 1,237 sprayer-hours was used in this work. Air application followed the same 21-day schedule; 13 applications were made to the 620 acres of citrus plantings. An aqueous solution of tartar emetic-sugar applied at 1-5-10 per acre has continued in use by air,

[4] Alan G. Forbes, Entomologist in Charge.



due to the danger of disrupting the Vedalia-cottony cushion scale complex.

In San Diego County, spraying was continued in a strip approximately five miles wide, from Jacumba west to the ocean. The value of this protective zone was amply demonstrated during October, when a male *Anastrepha ludens* was taken in a trap just across the border at Tecate, Baja California, 30 miles east of Tijuana. Eighteen complete bait sprays were applied to the San Diego County protective zone during 1955, using a total of 15,267 gallons of spray on 284,403 miscellaneous hosts at 42,260 properties, for an average of 0.053 gallon per host; 3,595 sprayer-hours were expended and 21,512 vehicle-miles run in this operation. Treatments in the San Ysidro eradication area were again augmented by soil applications of isodrin at the rate of four pounds actual per acre.

Trapping and fruit inspection in the town of San Ysidro went forward smoothly during the year. Seasonal fluctuations in hosts occur as a result of deciduous defoliation, but by hanging traps in certain nonhost species nearly 650 traps were maintained in the field throughout the winter; this total increased to 1,000 during summer months. All gathered fruit was carefully examined by competent inspectors for larval infestation, then fumigated with methyl bromide and destroyed. During the year, 1,730 pounds of mixed fruit were examined, 51,507 trap servicings on 12,208 properties were made using 5,445 pounds of brown sugar as bait, and 11,295 miles and 5,571 man-hours were expended. The 12 insects collected for identification, none of which were recorded as the Mexican fruit fly, are not indicative of total catch; this low total resulted from an increased knowledge of local fauna, which enables inspectors to eliminate species which might otherwise be sent in for identification.

Detection surveys, other than project activities in the San Ysidro area, are carried out by the United States Department of Agriculture and five southern counties. Federal trap lines are operated in California's San Diego and Imperial Counties, and in Yuma County, Arizona. At year's end, 2,432 traps were operating on 461 properties in these areas; 106,882 trap servicings were carried out and larval examinations were made on 2,244 individual properties. Coun-

ties participating in the protective program included San Diego, Orange, Los Angeles, San Bernardino and Riverside. Each county services 100 or more traps. Statistics show that county inspectors serviced 24,852 traps and collected 79 specimens for identification, none of which proved to be *A. ludens*. In addition to their trap program, San Diego County examined approximately 515 pounds of miscellaneous host fruit collected at 508 properties. No signs of infestation were noted. The total of 51,678 vehicle-miles was driven by county inspectors, and 4,699 man-hours were reported as inspection duties.

In contrast to 1954, when flies were taken virtually during every month of the year, only three positive collections were made during 1955. Two females were collected in Ensenada, one each in August and in September, and a third collection, a male specimen, was taken in a new area at Tecate, Baja California, 30 miles east of Tijuana, October 14th. Federal bait spraying was initiated at once in Tecate; by the end of December, four complete applications had been made. In Ensenada, treatment was continued on a 21-day schedule throughout the year, 16 applications being completed. No signs of infestation were recorded in either Mexicali or Tijuana during the year and, with the completion of the ninth and eleventh applications respectively, spraying was discontinued in these towns until further survey demonstrates the presence of fruit flies. Trapping was increased in Sonora and Baja California during the year. Trap lines extended from Ensenada north to Tijuana and east through Tecate and Mexicali, Baja California, to San Luis, Sonora, on the Mexican mainland. At year's end, 1,271 traps were operating on 343 properties. Most heavily trapped were the towns of Tijuana and Mexicali, where 418 and 225 traps respectively were serviced.

Cherry Fruit Fly, *Rhagoletis cingulata* [5]

The state-county project, seeking the eradication of the cherry fruit fly in western Siskiyou County, continued during the 1955 season without a single positive find. Previously completed treatment areas included Happy Camp and vicinity, certain intermittent locations along the Klamath River to Horse Creek, Scott's Bar, locations along the Scott River to Scott Valley, and Dunsmuir. In these areas trapping inspections and fruit sampling surveys will continue for another two years. In the event no live cherry fruit flies are collected it will then be assumed the insect has been eradicated from this area.

In Yreka, the only other area under treatment, host trees were sprayed for the second consecutive season with three pounds of 50 percent wettable methoxychlor per 100 gallons of water at 10-day intervals throughout the fruiting period. A total of 2,950 gallons of malathion spray was applied to 165 trees on 112 properties. Soil treatments using dieldrin were confined to surfaces under 26 host trees in and adjacent to the single known yard infestation.

County participation involved application of scheduled sprays, using state equipment and materials. Survey and inspection of both traps and fruit were handled by state personnel.

Citrus White Fly, *Dialeurodes citri* [6]

Project operations were confined to two areas, the Cities of Fresno and Madera. The Fresno infestation had received three annual treatments followed by two years of inspection, since the last live citrus white fly was found. A final inspection of the infested and adjacent areas recorded negative findings; therefore, eradication of the insect has been announced and all bureau work in the City of Fresno ended.

Work in the City of Madera involved the last in a series of three treatments, without finding live citrus white fly. A minimum of three annual inspections will follow. Treatment work in Madera totaled 72 sprayer-hours in treating hosts on 52 city blocks with 12,945 gallons of spray mixture. Material used consisted of one and two-thirds gallons of light-medium oil in 100 gallons of water, applied as a full foliage spray during March.

Both the Fresno and Madera County Departments of Agriculture contributed personnel to augment state operations.

Khapra Beetle, *Trogoderma granarium* [7]

Attempts to eradicate the Khapra beetle on a premises-by-premises basis were initiated, early in January, with a test treatment of the Continental Warehouse, Imperial, California. This first test, made in cooperation with the United States Department of Agriculture and the University of California, sought to determine if fumigation

[5] W. W. Wiard, Entomologist in Charge.

[6] Ted Gallion, Entomologist in Charge.

[7] Earle Gammon-Cyril Gammon, Entomologists.

and sprays can be depended upon to eradicate the insect from an infested warehouse practically free of any host storage, and from surrounding ground surfaces.

Because the Khapra beetle penetrates and conceals itself in cracks and crevices, and exists on the outside of structures as well as within, fumigation was decided upon, using gastight tarpaulins to cover the entire building. Because of its penetrating powers, safety and relative effectiveness, methyl bromide was selected as the fumigant, introduced at the rate of five pounds per thousand cubic feet of space for a 48-hour exposure period. As a result of many trials during 1954, a combination of malathion and diesel oil was selected as the spray material. Investigations by the United States Department of Agriculture, University of California and state workers had shown less expensive commonly used insecticides to be relatively ineffective. Malathion was used at the rate of five pounds of actual material to 100 gallons of spray, either straight diesel oil or a 50-50 emulsion of diesel and water.

The Continental Warehouse test proved eminently satisfactory; no survivors were found in the thousands of "planted" live Khapra beetle or in the general infestation throughout the structure. Many subsequent inspections also failed to reveal survivors in the structures.

Having proven that eradication was possible in a premises nearly free of host material, another cooperative test was set up involving bulk storage. The premises selected for this second test was a large warehouse at Alpaugh, Tulare County, completely filled with bulk barley in a single mass. Recirculation equipment, to facilitate uniform gas distribution, was devised and installed in the grain, and the same dosage-exposure procedure as in the first test was followed. Here again the test was successful, and it was decided that warehouses containing bulk grain also be included in the suppression program, providing recirculation equipment was installed.

A third test was initiated at Corcoran, Kings County, in a warehouse, Tulare Lake No. 1, which contained bulk grain in a single mass as well as two bins containing grain to a depth of about 23 feet. Purpose of this test was to determine if desired concentrations were obtained in bulk grain without the use of recirculation equipment. Initial concentration requirements were reached after 15 hours exposure, only three hours later than in the earlier test in which recirculation equipment had been operated. Despite this success, recirculation units continue to be utilized where grain depths are excessive, to assure early attainment of required concentrations.

In the interim, at a conference of United States and California Departments of Agriculture personnel, a measure of treatment efficiency was established to allow premises so treated to be released from infested status. Briefly, this yardstick required establishment and maintenance, for any 24-hour period during the 48-hour exposure, a concentration of 32 ounces of methyl bromide per thousand cubic feet at all points within structures being fumigated, as well as throughout the grain mass or other host material present. These concentrations were to be measured by a method of quantitative analysis involving thermal conductivity of gases, using a specially designed apparatus called a "Gow-Mac." These instruments have been used on all premises fumigations, both test and routine, and from time to time are checked for accuracy by chemical analysis.

Contracts were entered into with licensed pest control operators for gastight covering of successive premises, and fumigations of infested premises followed as fast as logistics for such operations would allow. Total expense of such operations, contract cost of covering buildings, methyl bromide, diesel oil and malathion, was borne by the California Department of Agriculture until July, when the United States Department of Agriculture first participated in the program on a cooperative basis by providing approximately one-third of costs. Their contribution has since consisted of furnishing all methyl bromide and about one-half of the diesel oil and malathion.

During November, another conference between personnel of the federal and state departments was held, and alternate fumigation treatment schedules to meet special problems were agreed upon. Requirement of a concentration of 32 ounces of methyl bromide for any 24-hour period during the 48-hour exposure period was continued as the standard, but in certain cases, where such a high concentration would be difficult to attain because of certain host material present, an allowance for a 24 ounce concentration for any 36-hour period during the 48-hour exposure period was agreed upon.

A second revision or alternate treatment provided for maintenance of a very high concentration, 64 ounces of methyl bromide for 12 hours, after which the covering tarpaulins could be removed. This latter schedule, to be used only in completely empty dairy barns of chicken houses, was considered necessary because of the number of dairy and chicken farms on the infested list; a greater exposure period would seriously affect their operations.

During the year, 102 properties were treated, 32 in southern California and 70 in northern California. A total of 38,492,454 cubic feet was involved in these fumigations and required 279,163 pounds of methyl bromide; spraying of premises required 86,817 gallons of diesel oil and 1,517 gallons of emulsifiable malathion, each gallon containing five pounds of actual malathion.

The United States Department of Agriculture, Agricultural Research Service, Plant Pest Control Branch, assigned a research entomologist to work full time with state personnel in planning and supervising procedures and conducting fumigations. Several federal workers, later assigned to various phases of the project, particularly during the first half of the year, were most active in survey and quarantine work; however, during the last half of the year, they greatly assisted with fumigation work and in distribution of federal supplies of methyl bromide, diesel oil and malathion. Such contributions of federal survey personnel during the last half of the year were of major importance.

One premises was inadvertently reinfested following treatment, after it had secured grain from a supposedly uninfested warehouse later found to be infested. Both premises were fumigated under the same provisions, since the owners of the reinfested warehouse were not at fault.

As of December 31, 1955, there were 233 properties with an estimated 51,888,028 cubic feet known to be or to have been infested. Although less than half the total premises were treated, it is evident that over two-thirds of the actual volume involved were treated and released from infested status. This was possible because an effort was made to clean the large distributing warehouses and mills at as early a date as possible in order to prevent further dissemination of the pest. Premises treated were of many types and ranged in size from a warehouse of over three and a half million cubic feet to on-farm storage of only a few hundred feet.

The largest fumigation job, (J. B. Hill Company, Fresno), involved over 3,600,000 cubic feet. Some bins and extensions from the building were more than 120 feet in height; nine and one half acres of tarpaulins were required for adequate coverage. Fifteen tons of methyl bromide were used in this fumigation, but for one on-farm storage with a total volume of only 850 cubic feet, ten pounds of methyl bromide were used. Conversely, some properties, although small with respect to cubic footage, required large amounts of diesel and malathion. As an example, a ranch property of only 270,000 cubic feet in Colusa County required 7,750 gallons of diesel oil and 58½ gallons of malathion, but the largest treated premises of 3,600,000 cubic feet required only 1,750 gallons of diesel oil and 13 gallons of malathion. Properties were catalogued according to function, such as dealers, feeders or storage. Obviously, dealer and storage establishments are most important from the standpoint of dissemination and practically all known infestations included in the dealer category have been treated. Of the 233 known infestations, 55 were listed as dealers, 20 as storage and 158 as feeders.

Hall Scale, *Nilotaspis halli* [8]

The Hall Scale Eradication Project, organized in 1941 as a cooperative project with the United States Department of Agriculture and the Butte County Agricultural Commissioner's office, seeks as its objective the elimination of this pest of stone fruit from the only known infestations in the Western Hemisphere.

Since inception of the program, more than 800,000 host trees have been inspected in a continuing survey to delimit distribution of the species. Eight established infestations, seven localized areas in Butte County and one in Yolo County comprising some 48,000 host plants, have been discovered and incorporated into the treatment program. Of these, six locations involving 46,000 host trees have been successfully eliminated by a program of voluntary removal or following three successive annual fumigations subsequent to the last finding of live scale insects. Only in the Chico area, where 2,122 host trees on 412 properties will

[8] E. H. Fosen, U. S. Department of Agriculture, in charge.

be involved for one or two more seasons, are further treatments scheduled at this time.

During 1955, inspection of 66,000 host trees on 5,000 properties in all areas of potential hazard revealed the eighth area of infestation, in the City of Chico.

Voluntary orchard and dooryard host removals from 835 properties totaled 4,265, the majority from the new area of infestation and reducing to this extent the treatment load. Survey of wilderness areas adjacent to known infestations produced 927 seedling host plants which were removed and destroyed. Current removal totals now exceed 17,000, or approximately 35 percent of the over-all host numbers involved in the eradication program.

Following discovery of the new Chico infestation during January, all host trees over a 13-block area were fumigated. With the approach of host stages intolerant to dormant fumigation schedules, the balance of the 96-block eradication area was sprayed with 2 percent light medium emulsive oil. During a month and one-half period commencing in early October, all treatment areas were covered, fumigating 6,560 hosts on 1,161 properties with nearly 5,000 pounds of HCN (hydrocyanic acid gas). Five fumigation crews, employing 58 personnel, were used in these operations. Davis, Oroville and one Chico area were dropped from further treatment considerations as the result of this effort.

Western Grape Leaf Skeletonizer, *Harrisina brillians* [9]

Despite maintenance of modified grape leaf skeletonizer holding operations during 1954, spread of the insect has continued. In view of this spread, both the program and possible benefits accruing from its continuance were reassessed. Major points considered were (1) the vastly increased cost of continuing work in the new and inaccessible areas of infestation; (2) the improbability of preventing further spread despite such action; and (3) the effective results of the biological control program administered by the University of California.

Based on these facts, the 1955 program was reduced to an intensive survey of producing vineyards within the infested area, as an aid to commissioner enforcement of quarantine restrictions and aimed at preventing long-range spread. Emphasis was also placed on peripheral scouting surveys north and west of the known infested area, in order to adjust quarantine lines and rapidly cover new area extensions. Pesticide treatment of infestations was not contemplated or carried on; all work was limited to inspection.

In accordance with this decision, work was initated during August when a state and county crew began inspection in El Cajon Valley, San Diego County. Working north and east, producing vineyards situated within the quarantine line were carefully inspected at three-week intervals. All vineyards within the quarantine area were checked at least twice during the season; 1,700 acres of early grapes in the Borrego Valley on the eastern edge of the quarantine area were under constant surveillance by San Diego County inspectors during harvest in late June and early July. An extended heat wave during September, which severely browned many vineyards, made them unsuitable for inspection; therefore, all organized inspection was terminated on September 30th.

Inspections were made on a total of 189 properties, of which 166 may be classed as producing grapes for market. Infestations were found on three of those inspected, two in El Cajon Valley; and one southeast of Julian, both in mid-San Diego County. Total acreage inspected during the season was 3,033, of which 16 acres were found to carry infestation. Project inspectors walked through seven miles of canyon to inspect 272,850 square yards of wild vines, 99 percent lying beyond the known infested area. Infestation was found in one short canyon on the southern slope of Palomar Mountain, northern San Diego County. A total of 138 man-hours was expended by San Diego County on survey work, 719 by state personnel. Vehicles traveled 3,813 miles during the survey period.

All other infestations were found by research workers of the University of California bio-control laboratory, La Mesa, who concentrated their work in portions of the Sweetwater and San Diego River drainage patterns lying within 15 miles of El Cajon Valley, in addition to several trips to infested canyons bordering the Borrego Desert. Light infestations were recorded on wild vines at seven localities. Twenty-two domestic infestations were found from Alpine, west through El Cajon Valley to La Mesa and the east San Diego area.

Infestations were reported from ten town-

[9] A. G. Forbes, Entomologist.

ships, all in San Diego County. No extension of the insect's range was recorded. In view of such restricted inspection, recorded infestations cannot be used to determine actual 1955 distribution. Undoubtedly infestations occurred on wild grape vines which were not surveyed.

Inspections adjacent to the quarantine area were made by county and state crews. One week was spent in examining vineyards in southern Riverside County. Scouting surveys were made of 533 acres of vineyard, most of which lie within ten miles and within sight of the probable infestations in Palm and Horsethief Canyons. Wild and cultivated vines were carefully checked around the perimeter of the quarantine area, but no infestation extensions were recorded.

Rumored occurrence of skeletonizer in the vicinity of Tecate, Baja California, was investigated by a survey entomologist in mid-October. A rapid scouting survey of the majority of large vineyards in the area produced no evidence of the presence of *Harrisina*. Reported damage by worms was probably due to the beet army worm, *Laphygma exigua*, numerous specimens of which were taken in the pupal stage. Although not investigated, reported infestation in Ensenada, Baja California was probably another pest since the canes were said to have been eaten through.

Parasite incidence during the spring and summer was excellent, ranging up to 65 percent parasitism with *Sturmia* in some areas. The heat wave in September, however, reduced parasite field populations drastically. The granulosis virus was evident throughout the experimental vineyard in El Cajon, and occurred very heavily in *Harrisina* larvae on wild grapes in Japatul Valley, 13 miles to the east.

Walnut Husk Fly, *Rhagoletis completa*

The first recorded infestation of walnut husk fly, *Rhagoletis completa*, in northern California was discovered during the fall of 1954 in Sonoma County. Systematic trapping for the insect was started in 1955, and on July 12, 1955, adult flies were collected from host plants on the west edge of the city of Sonoma. Subsequently, positive findings were recorded throughout Sonoma Valley extending for 20 miles, from near the Napa County line southeast of Sonoma to a location between Kenwood and Santa Rosa.

At the request of the walnut industry and in cooperation with the Sonoma County Agricultural Commissioner, limited suppressive treatments were applied in an attempt to restrict spread of the insect while developing information on distribution of established infestations. Treatments consisted of applications of dieldrin at the rate of six pounds dieldrin per acre of soil surface, applied with an orchard sprayer. All walnut trees within an area of one-half mile radius of the original infested property adjacent to the city of Sonoma were subjected to such treatment. In addition, locations at Boyes Springs and Kenwood were treated.

The above application required 117 sprayer hours and covered 1,249,399 square feet under 1,933 trees; 267 properties were involved, which included both residential and commercial plantings.

During the season, another infestation reported in Frazier Park, Kern County, represented the first established infestation of the insect in this area.

Trapping and survey for new infestations in these and other northern California counties was performed by state and county personnel.

Wheat Sawfly, *Pachynematus sporax*

An incipient infestation of wheat sawfly, *Pachynematus sporax*, originally discovered during 1951 in Cuyama Valley, was treated with two applications of DDT and diesel oil, one in the latter part of April and another in early May. Dosage was one pound of DDT in two gallons of diesel oil applied at the rate of two gallons of the mixture per acre. Results of the treatment were excellent, and no live specimens were detected after the second treatment.

Two airplanes, flying at elevations of 25 to 30 feet and covering 100-foot swaths, utilized four landing strips in the course of this work. More than 16,000 acres were covered in each application. Treatment areas extended from one mile west of New Cuyama, east beyond Highway 399 and as far south as Ventucopa.

State personnel were assisted by inspectors from both Santa Barbara and San Luis Obispo county departments of agriculture.

REGULATORY CONTROL PROJECTS

MEREDITH JONES, *Economic Entomologist*

Certain major insect pests, because of their migratory nature, are not amenable to individual grower control. Such infestations originate on lands which are far from the high value crops later attacked, and involve breeding sources of little or no concern to the resident owner. State participation in controls involving sugar beet leafhoppers and grasshoppers falls in this category.

Sugar Beet Leafhopper, *Circulifer tenellus* [10]

The application of controls over more than 193,000 acres of native host plants of the beet leafhopper, during the fall of 1954 and winter and spring of 1955, proved highly successful in giving protection to cultivated host crops. Using "curly-top" susceptible tomato fields as a yardstick, a series of three surveys in San Joaquin, Sacramento, Salinas and Santa Clara valleys revealed an average of only 1 percent damage attributable to attack of the virus carried by this insect. This compares favorably with the degree of control maintained during the past few years.

A few tomato plantings adjacent to the foothills in the Tracy and Newman areas showed from 5 to 28 percent damage as a result of a second generation of leafhopper in this sector. Prior to the inauguration of aerial spray applications to Russian thistle during 1950, however, from 10 to 20 percent loss in all tomato acreages was the normal expectancy.

Four specifically timed spray programs are essential for maintenance of low infection incidence and include treatment of Russian thistle in the fall; brushy perennials, principally *Atriplex* and *Lepidospartum*, in late fall; and winter annuals, basically redstemmed filaree, during winter and again in the spring.

TABLE 1

County	Winter 1/3–2/8	Spring 3/29–4/14	Russian thistle 10/1–11/15	Perennials 11/7–11/28	1955 total
Fresno	2,492	955	54,431	4,090	61,968
Kern	596	4,825	83,299		88,720
Kings		2,050	65,703		67,753
Merced	600			116	716
Monterey				108	108
San Joaquin	298	185		698	1,181
San Luis Obispo			2,982		2,982
Stanislaus	125	85		215	425
Totals	4,111	8,100	206,415	5,227	223,853

During the 1955 season, approximately 225,000 acres in eight counties were sprayed with one pound of actual DDT and two to three gallons of diesel oil per acre, the latter gallonage on brushy perennials. Table 1 summarizes these operations.

Winter and spring treatments, covering more than 12,000 acres of foothill breeding grounds, were applied by state personnel employing Buffalo turbines mounted on power wagons. By April, spring flights of the leafhopper from foothill breeding grounds onto the valley floor had occurred.

Russian thistle mapping during June revealed 300,000 acres of summer hosts, but by September this estimate had dropped to 200,000 acres due to the drying of vegetation. Population studies showed four full summer generations developing on thistle. In order to allow for rapid, uniform and widespread coverage, all surveys were made by helicopter. By early October, leafhopper populations on thistle ranged from 5 to 500 per net-sweep and averaged 25 percent overwintering forms. On this basis, aerial applications to thistle acreages were begun October 4th and concluded 17 days later. More than 200,000 acres were sprayed by four contracted aircraft, which operated progressively from 24 landing strips extending from the Carriso Plains, San Luis Obispo County, to Edison Hills, Kern County. Three thousand acres were sprayed in San Luis Obispo County, 55,000 in Fresno County, 66,000 in Kings County, and 83,000 in Kern County. Ground rigs covered an additional 6,000 acres of marginal scattered patches of thistle. Subsequent mortality counts revealed in excess of 98 percent kill. Residual effectiveness was found up to 30 days after spraying. By November thistle had dried, and remaining populations had moved to brushy perennials in foothill canyons, where the final treatment for the year was applied to more than 5,000 acres.

Another phase of control activities involved destruction of isolated stands and scattered roadside plants of Russian thistle to prevent reseeding and extension of host acreages. This work is accomplished by

[10] Harold Green, Entomologist in Charge.

TABLE 2

District	County	Acres cut	Acres 100%	Acres sprayed	Miles road	Miles ditch	Man-hours worked
1	Alameda	200	4		17.1		86
1	Contra Costa				50.5		38
2	Fresno	10,481	65	111	144.0	41.7	2,296
3	Fresno	5,844	152	8	408.5	36.5	2,913
4	Kern	1,915	83	536	1,326.6	4.0	3,118
1	Merced				129.1	12.3	95
2	Merced	16,797	189	176	643.6	45.9	4,607
1	San Joaquin	6,655	147	44	378.0	46.7	3,114
1	Stanislaus	1,219	43	16	469.8	26.0	1,034
	Seasonal Totals	*43,111	183	891	3,564.2	213.1	17,301

* Large acreage totals are due to coverage of areas where just an occasional scattered plant is destroyed.

hoeing crews and by spray applications of Sinox and diesel oil. A thistle-free area has been successfully maintained along rangelands from Altamont Pass, Alameda County, to Little Panoche Canyon, Kern County. Table 2 shows work accomplishments of this type for the 1955 season.

Egg parasite releases by the University of California were concluded during 1955. More than 300,000 specimens of seven strains of *Lymaenon, Aphelinoidea* and *Oligosita*, were involved this season. Releases were made in Fresno, Kern, Ventura, Los Angeles, and Imperial Counties. Next year efforts will be directed to recovery collections at various release locations.

Grasshopper Control [11]

Grasshopper infestations of economic concern in California are generally found in grassland areas adjacent to high-value croplands. Controls seek, through early detection, to reduce nymphal populations on such marginal lands before serious migration into adjacent plantings takes place. In some areas, particularly subirrigated or irrigated meadows, protection of grasses is also important. Locally, crop species of grasshoppers in alfalfa, clover and permanent pasture require control attention.

At the state level, assistance is given in anticipating outbreaks through survey and observations, advising and organizing community effort and assisting with directing the control programs so established. All such participation is in conjunction with the staffs of the county agricultural commissioners. This year, as well as in the past, the United States Department of Agriculture, Grasshopper Control Project, through the services of its area leader assisted in the survey, organization and supervision of grasshopper control activities.

In the fall of 1955, state personnel in cooperation with federal personnel, held five workshops throughout the State where county personnel were trained in procedures and methods of making the fall adult grasshopper survey. Seventy-three representatives from the staffs of the county agricultural commissioner offices attended these workshops. The training of county personnel in this kind of work resulted in a more thorough adult grasshopper survey in 1955 than would have otherwise been possible. The survey indicated that approximately 1,318,500 acres of grassland carried grasshopper infestations of potential economic significance for 1956. The areas of greatest importance are in the following areas: Humboldt County, northern Sacramento Valley, some of the western slopes of the Sierra-Nevada mountain range, and parts of San Diego and Riverside Counties.

The actual cost of the 1955 control practices was the responsibility of the landowner or operator and the county governments. In some counties the cost of material was borne by the county and the cost of application was borne by the landowner or operator. In other counties, the entire cost of material and application was borne by the landowner or operator. In California during 1955 there were no grasshopper or Mormon cricket control projects that involved federal aid.

There were no major changes in the distribution of grasshopper species in California during 1955. On a state-wide basis the devastating grasshopper, *Melanoplus devastator*, was the dominant foothill species; the valley grasshopper, *Oedaleonatus enigma*, was found to be intermixed with other

[11] M. M. Poyner, Assistant State Leader, in charge.

species in localized areas; and the clearwing grasshopper, *Camnula pellucida*, predominated at higher elevations. Other species of importance include: *Melanoplus marginatus*, *Melanoplus femur-rubrum*, *Melanoplus differentialis*, *Melanoplus mexicanus*, *Stictbippus (Hippiscus) californicus*, and *Trimerotropis* spp.

Mormon crickets, *Anabrus simplex*, were of no importance in 1955. A check survey was made along California-Nevada state line areas but no infestations were found or reported.

Grasshopper control work was done in 23 California counties in 1955. As reported by the county agricultural commissioners,

78,868 acres were treated in 1955. Of the total acreage treated, 66,170 acres were sprayed, 10,226 acres were baited, and 2,472 acres were dusted.

In the 23 counties where grasshopper control practices were used in 1955, it has been estimated that 153,582 acres of high-valued crops were protected at a saving of $6,583,695. It is also estimated that the loss before grasshopper control practices were initiated in the same areas was $1,390,176.

In 1955 grasshopper control work was done in the following counties: Amador, Butte, Calaveras, El Dorado, Glenn, Humboldt, Imperial, Kern, Kings, Lake, Los Angeles, Madera, Marin, Merced, Monterey, Nevada, Placer, Riverside, San Diego, Santa Barbara, Shasta, Siskiyou, Stanislaus, Sutter and Tehama.

Approximately 20,384 pounds of insecticides were used for the control of grasshoppers in 1955. This figure does not include the tonnage of organic phosphate insecticides that was used in desert areas of Southern California to control the spotted alfalfa aphid and which affected concurrent control of a threatening infestation of *Melanoplus mexicanus.*

SPECIAL INSECT PEST CONTROL PROBLEMS

STEWART LOCKWOOD, *Economic Entomologist*

This function deals largely with regulatory and service work in cooperation with county agricultural commissioners in the suppression of insect pests affecting the quality standards and production of growing crops.

Cereal and Forage Pests

Spotted alfalfa aphid, *Therioaphis maculata:* This insect continued to spread throughout the State. In 1954 damage to alfalfa in the infested areas of Imperial, Riverside and San Diego Counties was estimated at $337,000.

By the end of 1955 approximately 727,000 of the State's 1,120,000 acres were infested in 32 counties. The known infestation extends from the Mexican border north through Central California into Shasta County and along the coast into Santa Cruz, Santa Clara and Alameda Counties. By the end of the 1956 season it is anticipated that all host areas will have been reached.

In many counties the infestation was so new that the exact place of this insect in the economics of alfalfa production was still undeveloped. However, in 21 of these counties agricultural commissioners estimated the crop loss from this insect on 726,680 acres at $9,000,000 with expenses of treatments adding $4,000,000 for a total loss of $13,000,000.

Considerably more than 20,000 farmers growing alfalfa in California are directly affected by factors which lower the yield and grade of their crop. A larger number of livestock and dairymen, poultry and rabbit growers are affected by the availability and price of clean hay.

A number of native predatory insects have been observed destroying the spotted alfalfa aphid. Lady bird beetles, lacewings, minute pirate bugs and syrphid fly larvae have been most active. Recently a predaceous mite, as yet undescribed, has been observed feeding on the aphid while fungus diseases have given local control.

Unfortunately, the most effective chemicals used against this aphid are also destructive to parasites and predatory insects. Parathion, malathion and Systox have been used most often, TEPP and toxaphene not so frequently.

Parathion is applied at the rate of two to four ounces of actual material per acre, malathion at 8 to 12 ounces and Systox at two to four ounces. It has been found that as little as five gallons of spray mixture per acre gives fully adequate control in foliage 12-15 inches in height.

Control costs have averaged $2.75 per acre, $1.50 per acre for application and $1.25 for insecticides, for an average of approximately $1 per ton of hay produced. Timing of control applications is of course extremely important in minimizing production costs. In general, seedling stands should be treated whenever aphids are found over a planting, even one specimen per plant capable of doing severe damage. When honeydew becomes evident in older stands, unless cutting is imminent or biological control factors showing promise, controls must be applied. Because these materials are hazardous to livestock, it was suggested to alfalfa growers that after application of these materials they wait until the residues of these materials be dissipated by weather

and lowered by plant growth, that is, for malathion seven days, parathion 14 days and Systox 21 days between treating the field and cutting the crop.

Pea aphid, *Macrosiphum pisi:* While not as injurious over so wide a territory as in past years, some growers had to use parathion at the rate of two to four ounces per acre or malathion at 8 to 12 ounces per acre, while others used a DDT 5 percent dust.

Alfalfa weevil, *Hypera postica:* Control of this pest in the northeast corner counties was maintained by the use of heptachlor or dieldrin applied in the early spring before new growth was two inches tall. Application was made at the rate of 1.5 pints of dieldrin emulsion or one pint of heptachlor in 10 gallons of water per acre.

When application was by air the same amounts of active ingredients were diluted in two gallons of diesel oil per acre. Inspections showed little or no loss following thorough application of these materials.

Cotton Insects

A tortricid, *Platynota stultana:* A number of materials was used by cotton growers in the Imperial Valley to prevent possible damage caused by great numbers of this insect. Observations of the effectiveness of these materials were carried on in cooperation with the agricultural commissioner and representatives of the university. Considerable damage to squares and young bolls was present over much of the valley. Infested blossoms were rosetted at times by attachment of silk threads to the petals.

Parathion was probably more effective than other materials, however, DDT seemed to be as satisfactory in terms of cotton harvested and was preferred by many growers. BHC, or BHC plus 10 percent DDT seemed no better than DDT.

Yield in the valley, regardless of the outbreak of this insect, was generally at a high level. Damaged young bolls were no greater in many fields than the number of bolls which normally drop.

Fruit Insects

Pear psylla, *Psylla pyricola:* Finding of the pear psylla in Potter Valley, Mendocino County, and in Scott's Valley, Lake County, brought this pest for the first time to the fringe of commercial pear growing in California. Earlier it had been found in noncommercial pear trees in Siskiyou, Trinity, Shasta, Del Norte and Humboldt Counties.

Rigorous controls based on experimental work at the Southern Oregon Experimental Station at Medford, Oregon, and which had proven to be highly successful in commercial pear orchards there, were inaugurated.

Sprays generally used consisted of the addition of one pound of 25 percent parathion wettable powder or two pounds of 25 percent malathion wettable powder in 100 gallons of spray for codling moth. In some orchards two and three cover sprays were applied.

Oriental fruit moth, *Grapholitha molesta:* Fruit and twig damage by this insect in peach orchards was not as pronounced in the Kings River area of Fresno, Kings and Tulare Counties as in 1954, but heavy flights of moths were present in some orchards. As high as three sprays of two pounds of 50 percent DDT wettable powder in 100 gallons of water followed by three applications of 5 percent DDT powder were used by some growers. Timing of sprays and dusts was governed by numbers of moths in traps.

Considerable twig damage but very little loss from wormy fruit was observed in several orchards. One of these had received 60 percent damage in 1954.

Wooly apple aphid, *Eriosoma lanigerum:* Control of this aphid was obtained to a satisfactory degree. In commercial apple orchards trees were free of wooly apple aphids when growers added two pounds of 25 percent wettable malathion powder to 100 gallons of DDT spray for codling moth. Three such applications were sufficient to prevent any colonies of this aphid forming on the tree trunks or limbs until September. Rosy apple aphids, *Anuraphis roseus,* were kept in control by these three sprays and in only one orchard were green apple aphids sufficiently numerous to curl and cup the foliage.

Consperse stink bug, *Euschistus conspersus:* There was a growing use of dieldrin as a cover crop spray in decidous orchards for this pest. Material was applied in early spring as a spray of from one-half to two pounds per acre. Both stink bugs and leafminers overwintering in fallen leaves were killed. Experimental evidence developed by technicians of the Department of Fish and Game is to the effect that dieldrin applied at one-half pound per acre will not harm game animals.

Aid was given agricultural commissioners relative to control of a number of other

fruit and orchard pests where quality of fruit or spray residue presented a regulatory problem. Included were pear rust mites, *Epitrimerus pyri;* pear leaf blister mites, *Eriophyes pyri;* a mite on boysenberry, *Aceria orthomera;* and a red-humped caterpillar, *Schizura concinna.*

Nut Insect Pests

Heavy infestations of walnuts by the filbertworm, *Melissopus latiferreanus;* codling moth, *Carpocapsa pomonella;* and the navel orangeworm, *Myelois venipars,* in 1954 resulted in considerable walnut orchard inspection in 1955. Growers were advised the following would aid in suppressing these worms:

1. Thorough spraying for codling moth wherever this insect is present in walnut plantings.
2. Harvest as soon as the hulls start splitting.
3. Extra precautions to remove all hulls and nuts which may harbor the navel orangeworm.
4. Removal from orchards, or burial of hulls and cull nuts.
5. Fumigation of all sacks used in harvest or storage away from the farm.

In 1955, wormy nuts were far less a factor over most of the central part of the State. Grower losses were not so heavy and the costs of grading were reduced.

Hop Insects

Two-spotted spider mite, *Tetranychus telarius:* This pest continued to be an important factor in hop production in the Central Valley hop fields. Weekly checking of a block treated with 1.5 pints of Systox per acre showed that this material kept the mites under commercial control from the time of application in July, until harvest. No residue or off-flavor was found at harvest time.

Hop aphid, *Phorodon humili:* This pest was present in harmful numbers only in hop fields bordering or close to prune orchards. Aphids did not increase in hop fields close to prune orchards where winter sprays for aphids had been applied.

Tree hoppers, *Stictocephala pacifica:* Several hop fields were reported infested by a migration of this insect from native growth around the hop fields consisting of California white oak, poplar trees and willow trees. An application of DDT 5 percent dust at 80 pounds per acre successfully terminated the outbreak.

Vegetable Crop Insects

Pea aphid, *Macrosiphum pisi:* Considerable damage occurred in localities producing peas for early spring harvest. Equally satisfactory control of the pea aphid seemed apparent in fields treated with DDT or parathion dust in late May.

Artichoke plume moth, *Platyptilia carduidactyla:* While not as abundant and injurious as in 1954, considerable loss occurred to late maturing artichokes. Larvae inside damaged buds left in the field matured without difficulty and undoubtedly were largely responsible for continued damage, increasing as the season advanced. Individual growers and groups of growers were urged to get worm infested artichokes out of the fields and disposed of by oiling or burning.

Chemical controls were partially successful when application was made as soon as the tiny eggs were found on leaves or buds.

COMMODITY AND PREMISES TREATMENTS

C. GAMMON and E. GAMMON, *Economic Entomologists*

Problems requiring the immediate development or revision of treatment measures to alleviate plant quarantine restrictions and to permit movement of restricted commodities from infested areas without danger of further pest spread, continue to arise. Included in such work is the development of procedures essential to the conduct of eradication projects. These measures are either preliminary to long-time research by the University of California or the U. S. Department of Agriculture or are concurrently developed as emergency measures.

Khapra beetle, *Trogoderma granarium,* was again the major insect against which such action was needed. Test or experimental premise fumigations were conducted cooperatively with the University of California and the U. S. Department of Agriculture to determine the best materials and procedures to use in eradicative action against this insect in connection with the over-all

Khapra beetle suppression project. These tests have been discussed in some detail under the general heading Khapra beetle.

The time element, 12 hours, involved in the fumigation of trucks or carloads of grain destined for movement from Khapra beetle infested premises was very unsatisfactory to trucking concerns. Accordingly, with the Entomology Research Branch of the U. S. Department of Agriculture, methods were worked out whereby it was possible to cut the exposure time under gas-tight tarpaulins to three hours. One method was the use of a heavy liquid fumigant plus the addition of methy bromide. Three gallons of a fumigant mixture composed of ethylene dichloride, carbon tetrachloride and methyl bromide applied as a liquid over each 10 tons of grain, with an additional two pounds of methyl bromide per 1,000 cubic feet at 60 degrees F. or above or three pounds at 40-59 degrees F. introduced over the load as a hot gas, was found to be fully effective.

A second fully effective method of reducing the exposure time in bulk grain involved dosages of seven pounds of methyl bromide per 1,000 cubic feet for three hours at 60 degrees F. or above, or eight pounds per 1,000 cubic feet for three hours at 40-59 degrees F., the application to be by forced recirculation.

In connection with the forced recirculation work, a system of using probes with perforated points was worked out. These probes could be forced down through the grain with the perforations near the bottom and the upper ends attached to the intake side of electric vacuum cleaners by regular hose attachments. The gas was then pulled down through the grain and exhausted over the load. These outfits were remarkably effective and were very reasonable in price. They filled an urgent need and were widely used by industry for the disinfecting of grain for movement into trade channels. They were also in almost constant use in the premise fumigation for Khapra beetle in grain filled bins as well as in some flat bulk storage.

An alternate to the 24-hour exposure period heretofore necessary in the fumigation of sacks and bagging was also worked out. This called for fumigation in a sustained 25-inch vacuum for three hours, using four pounds of methyl bromide per thousand cubic feet at temperatures of 60 degrees F. or above, or five pounds per thousand cubic feet at temperatures below 60 degrees F.

Other commodity treatment work during the year included development of a new methyl bromide schedule at varying temperatures for carload potato fumigation, and methyl bromide fumigation of dormant gladiolus bulbs for *Sclerotium rolfsii*. These were reported in mimeograph form.

One request involved the determination of a methyl bromide schedule lethal to all stages of the black widow spider, *Latrodectus mactans*. It was determined that one pound of methyl bromide per thousand cubic feet for eight hours at a temperature of 75 degrees F. or above was 100 percent lethal to all stages, including the eggs.

During the year a number of fumigation rooms were built by industry in various parts of the State to meet fumigation requirements of the Khapra beetle quarantines, particularly as they applied to the fumigation of used sacks or bags. A great number of these rooms were inspected and advice given as to methods to bring them up to desired standards. However, they were not officially approved fumigation chambers in the sense that such chambers are inspected and given official approval by the State for fumigation of nursery stock or fruits and vegetables to satisfy plant quarantine requirements.

At the request of agricultural commissioners, advice on dosages, equipment and procedures for the fumigation of various commodities was given and plans and advice given to agricultural commissioners, nurserymen, mill operators, farmers and others interested in building fumigation chambers for various purposes.

Six new fumigation chambers were inspected and approved and at the close of the year, bureau records showed 62 officially approved fumigation chambers in operation in 17 counties. These officially approved chambers, once approved, are checked annually by the county agricultural commissioner concerned or by bureau personnel to assure that they are in good repair and in proper operating condition.

SYSTEMATIC ENTOMOLOGY

H. H. KEIFER, *Systematic Entomologist*

The insect, mite and mollusc specimens received by the Identification Laboratory during 1955 required a total of 30,168 identifications. (This number is a fraction of the actual specimens received since one or 100 examples of a single species received in a unit container from a single collection would count as one identification yet all might have to be examined to determine this fact). The above number is 4,840 more than for 1954. It represents an increase of 1,739 identifications for the county agricultural commissioners' offices; an increase of 3,186 for the Bureau of Entomology and the Bureau of Plant Quarantine of the California Department of Agriculture; and a large increase for the U. S. Department of Agriculture. This latter is due to the Khapra beetle survey. The accompanying table shows the amount of work done for each category.

Tabulation of Insect Identifications, 1955

	County agricultural commissioners	State Department of Agriculture	U. S. Department of Agriculture	Miscellaneous	Total
General Identifications	3,789	-------	77	191	4,057
Quarantine					
Interior	161	-------	-------	------	161
Interstate	203	-------	-------	------	203
Border	-------	5,948	-------	------	5,948
Surveys					
General	525	8,341	------	------	8,866
Khapra Beetle	5,277	234	1,810	-----	7,321
Red Scale	1,803	--- -	- --	- ---	1,803
Walnut Husk Fly	328	-- ----	-- --	--- --	328
Spotted Alfalfa Aphid	240	74	- - --	----	314
Cherry Fruit Fly	138	-------	------	------	138
Pink Bollworm	120	-------	-------	------	120
Mexican Fruit Fly	80	-------	-------	------	80
Walnut Worm	-------	-------	-------	566	566
Pear Psylla	-------	70	-------	------	70
Nursery Inspection	193	-------	-------	------	193
Totals	12,857	14,667	1,887	757	30,168

The principal identification problem during the season continued to be the Khapra beetle, *Trogoderma granarium* Everts. This is due to the fact that several species of *Trogoderma*, including *granarium*, are so similar that low-power magnification does not serve to separate them.

The personnel of the Identification Laboratory not only handles the routine work but also engages in projects designed to improve identification knowledge of important types of insects. F. L. Blanc has not only worked on aphid identifications in connection with the spotted alfalfa aphid, *Therioaphis maculata* (Buckton), but has also undertaken the problem of identification and classification of California fruit flies. H. L. McKenzie has been engaged in a revision of the Diaspid, or armored scales of California, designed to appear in the University of California Insect Survey Bulletin. G. T. Okumura has been working on identification of Citrus Lepidoptera. R. F. Wilkey has been investigating the taxonomy of springtails, Collembola.

Publications of the members of the Identification Laboratory during 1955 are: F. L. Blanc, March 10, 1955, with G. T. Okumura, California Department of Agriculture T-Series No. T-1, "Illustrated Key to Species of *Trogoderma* and to Related Genera Commonly Encountered in Stored Grain in California." F. L. Blanc with H. H. Keifer, 1955, Bulletin, California Department of Agriculture XLIV(2): 77-88, "The Cherry Fruit Fly in North America." H. L. McKenzie, 1955, Pan-Pacific Entomologist 31-(4): 173-190, "A New Species of Lepidosaphes Scale Infesting Umbrella Pine in California." G. T. Okumura, January 28, 1955, California Department of Agriculture T-Series, No. T-2, "Illustrated Key to Lepidopterous Larvae Found in Stored Walnuts and Almonds." G. T. Okumura, November 15, 1955, California Department of Agriculture, T-Series, No. T-4, "Illustrated Key to Lepidopterous Larvae Associated with Honeybee Combs in California." H. H. Keifer, 1955, Pan-Pacific Entomologist 31-(3): 109-116, "Eriophyid Mites—Notes and New Species." H. H. Keifer, 1955, Bulletin, California Department of Agriculture, 44-(3): 126-130, "Eriophyid Studies XXIII."

APIARY INSPECTION

ELBERT R. JAYCOX, *Supervisor of Apiary Inspection*

Estimated honey production in California for 1955 was about 30 million pounds, down about four million pounds from the previous season. Orange, buckwheat and sage flows were very poor, optimum production inhibited by the late, cool spring period. Cotton and star thistle flows during the summer were also disappointing. The production of alfalfa honey turned a poor season into a relatively good one for many beekeepers. In some areas, such as the Antelope Valley and parts of the Sacramento Valley, the yield from alfalfa was exceptional. In other major growing areas it also yielded well with much of the honey graded white instead of the usual amber grades. The market for honey closed very firm in 1955 with below average quantities available because of Canadian purchases in the United States.

Demand for and production of package bees and queens was very good. The cool spring weather was detrimental to queen matings and made it necessary for producers to feed tons of sugar to maintain production of bees and queens. Many California beekeepers purchased package bees to boost colonies reduced in strength by pesticides and inclement weather.

For the first time in four years the incidence of American foulbrood disease in California bees decreased, although not enough to offset the gradual rise which has been evident since 1940. In the major beekeeping counties there were no significant changes in the incidence of disease and no large lots of diseased equipment were found. More colonies were inspected in 1955 despite unfavorable spring weather.

A survey was begun in February to determine the incidence of Nosema disease, a protozoan infection of adult bees. Samples of dead bees from 11 counties were examined. Nosema infection was found in all counties except one with the percentage of colonies infected ranging from 5.9 to 73.9. A total of 646 samples of bees was examined microscopically for evidence of Nosema spores. Ninety samples or 13.9 percent of the total showed infection present.

In 1955, 30 counties had regular apiary inspectors who did bee inspection together with other agricultural inspection work. Five counties trained new men as replacements. Three counties employed part-time bee inspectors who did no other work for the county. A competent deputy state bee inspector was available during 1955, working from April to September in three counties.

Because of the Nosema survey, the number of disease diagnoses for 1955 was greatly increased over previous years. A total of 1,012 samples of brood and bees was examined. Of these, 51 were American foulbrood, 49 European foulbrood, 149 Nosema, one septicemia, and 762 showed no bacterial disease or protozoan infection present. Most of the negative samples were adult bees examined for Nosema disease.

The occurrence of septicemia was the first of record for the apiary section. The disease is a rare bacterial blood disease which attacks the adult bee. It has previously been diagnosed in bees from California by the U. S. Department of Agriculture Beekeeping Laboratory. The disease is considered to be transmitted through the tracheae by contact with contaminated water or soil. Affected drones were destroyed and the cages cleaned and sun-dried. No additional infection occurred and the source of the disease was not determined.

Sets of reference microscope slides of the causative organisms of bee diseases were prepared and distributed to four counties in 1955.

Of interest were collections of *Trogoderma versicolor* between hive parts feeding on the bodies of dead bees and *T. simplex*, associated with bee equipment.

The spotted alfalfa aphid and its control was responsible for nearly all losses of bees from pesticides during the year. In the desert areas, the treatment of weedy alfalfa fields early in the season with parathion caused continual losses of field bees which prevented colonies from building up. The bees in that area suffer a spring pollen shortage and actively visit mustard and other weeds which bloom early. Treatment of fields in which such weeds are plentiful can cause as much damage as treating crops in bloom, even though the alfalfa is only a few inches high. The losses decreased when Systox and malathion were substituted for parathion where possible. Two other cases of damage implicated a systox-toxa-

phene mixture but the Bureau of Chemistry was unable to find the materials in the dead bees taken from the affected apiaries. Two unverified reports of losses involved DDT dusts. The usual 5 percent dust, which has been relatively safe for bees, did not give satisfactory control and a 10 percent dust was used. The larger dosage is apparently above the safe level and caused noticeable losses to colonies near the treated acreage.

A total of 137 apiary brand numbers and 138 identification numbers were issued in 1955. The number of brands is about average but the number of identification numbers represents an increase over the two previous years and almost twice as many as were issued in 1953. The volume of bills of sale and other brand correspondence continued heavy.

A questionnaire postcard was prepared and sent to every brand owner of record with the department. The returned cards frequently showed that the beekeeper had branding irons for one or more brand numbers which had not been transferred to his name. The questionnaire results will be used for compilation of a new brand list.

Eight lots of bee equipment were reported stolen during 1955. A total of 345 two- and three-story colonies were stolen, as well as 40 supers. None of the stolen equipment was reported recovered.

Three wax-salvage plants continued to operate in 1955. Two plants are located in the Colton area and one at Colusa. A beekeeper in Porterville began construction of a building which he intends to use as a warehouse and wax-salvage plant. The price of beeswax averaged 16 percent higher than in 1954 and some sales were reported as high as 60 cents per pound. The increased value of the wax made the wax-salvage process more valuable than ever, and large numbers of diseased hives were processed at the three plants.

A new Section 281.5 was added to the bee diseases article of the Agricultural Code by the Legislature in 1955. The section provides that the director may authorize federal and state research agencies, under written permit, to transport and maintain diseased bees for the purpose of studying methods of eradicating and controlling bee diseases. One permit was issued under the new provisions.

A new printed informational leaflet, "Information for the Beekeeper," was prepared and distributed to several beekeeping supply companies. The leaflet is intended for inclusion with each sale of bee equipment.

The notice of movement of bees form was revised and printed on paper as well as on the traditional postcard. The paper notices were issued in pads of 50 sheets and most counties who received them immediately requested larger supplies. Beekeepers approved of the paper form because they were able to make three copies easily and kept one for their records.

A printed application and permit for movement of diseased bees and equipment to wax-salvage was prepared and printed during the year. The form, in four copies, was patterned after a county mimeographed form previously in use. Minor changes were made in the apiary inspection report to provide space to show that disease was taken to wax-salvage and to indicate the date on which immovable frame hives should be corrected. The form size was enlarged to 5 x 8 inches and an informational paragraph was added at the bottom of the form.

GENERAL INFORMATION SERVICE

The bureau has 13 entomological films covering major insect pest species subject to special attention by the department. These films portray in color the various life history stages of each species, typical plant damage due to their attack, and the measures being used to secure their control or eradication. Through this means regulatory officers and growers can become acquainted with the pests and the problems involved.

During 1955 films were shown to county agricultural commissioner, inspector, university and grower groups as shown in the following table:

Films	No. of showings	No. of individuals
Apiary	5	42
Beet Leafhopper	5	148
Cherry Fruit Fly	1	14
Corn Borer	4	90
Fumigation Methods	4	174
Grapeleaf Skeletonizer	3	79
Hall's Scale	1	10
Khapra Beetle	47	2,447
Mexican Bean Beetle	1	18
Mexican Fruit Fly	6	206
Olive Scale	1	25
Oriental Fruit Fly	5	159
Oriental Fruit Moth	2	120
Totals	85	3,532

Record of Inspection

County	APIARIES			COLONIES		
	Registered	Inspected	Diseased	Registered	Inspected	Diseased
Alameda	261	42	11	7,702	944	23
Alpine						
Amador	5	3	0	165	48	0
Butte	479	263	20	18,112	5,688	50
Calaveras						
Colusa	156	109	37	9,054	6,575	183
Contra Costa	19	59	6	2,242	1,982	10
Del Norte	5	0	0	43	0	0
El Dorado	0	0	0	0	0	0
Fresno		93	35	33,693	5,880	171
Glenn	186	39	8	8,394	1,232	24
Humboldt	7	2	1	33	6	3
Imperial	1,042	424	153	45,121	20,176	348
Inyo						
Kern	450	256	64	40,626	11,325	282
Kings	155	40	18	13,225	1,769	97
Lake	3	0	0	15	0	0
Lassen	17	9	2	450	216	3
Los Angeles	675	592	93	25,741	7,731	299
Madera	17	169	7	3,290	3,164	41
Marin	15	7	0	211	37	0
Mariposa						
Mendocino	71	59	1	284	383	1
Merced	224	69	28	24,315	3,337	82
Modoc	5	0	0	975	0	0
Mono						
Monterey	13	41	5	993	2,259	5
Napa	5	20	3	33	259	6
Nevada	2	0	0	7	0	0
Orange	183	296	33	5,311	3,979	86
Placer	31	43	5	1,680	2,006	6
Plumas	1	1	0	15	15	0
Riverside	470	131	27	18,903	4,651	178
Sacramento	83	38	10	2,220	523	48
San Benito	6	0	0	117	0	0
San Bernardino	506	487	84	12,662	19,466	220
San Diego	587	181	58	30,335	8,701	253
San Francisco	7	0	0	33	0	0
San Joaquin	85	214	64	6,755	9,423	267
San Luis Obispo	121	17	7	4,254	173	23
San Mateo	92	96	4	850	936	20
Santa Barbara	124	119	4	4,124	3,341	6
Santa Clara	47	122	21	664	1,060	98
Santa Cruz	103	16	3	2,591	967	3
Shasta	216	74	10	9,941	5,475	58
Sierra						
Siskiyou	2	19	4	50	96	8
Solano	161	149	3	6,745	3,900	4
Sonoma	270	154	33	5,325	3,093	77
Stanislaus	173	78	15	16,775	9,283	41
Sutter	230	0	0	11,684	7,630	29
Tehama	216	88	1	7,838	5,232	32
Trinity						
Tulare	67	55	15	17,265	3,644	81
Tuolumne	37	12	0	324	198	0
Ventura	127	59	21	6,557	1,647	323
Yolo	163	146	26	9,060	4,085	64
Yuba	64	82	20	3,328	2,909	142
Totals	7,984	4,973	960	420,130	175,444	3,695

Percent apiaries diseased	19.3
Percent colonies diseased	2.11
Percent estimated number of colonies in the state which were registered	78.2
Percent estimated number of colonies in the state which were inspected	32.7

Six separate television showings using excerpts from some of these films reached additional audiences.

Mimeographed releases during the year totaled 40 as follows: "A" series, apiary, 9; "E" series, general entomology and pest control, 25; "S" series, survey, 2; and "T" series, taxonomy, 4.

Record of Migration

County	INTERSTATE				INTERCOUNTY				INTRA-COUNTY	
	Into		Out of		Into		Out of			
	Apiaries	Colonies	Apiaries	Colonies	Apiaries	Colonies	Apiaries	Colonies	Apiaries	Colonies
Alameda					6	415	15	3,925	3	145
Alpine										
Amador					2	86				
Butte	12	1,830	1	65	102	7,917	116	7,771	168	5,357
Calaveras										
Colusa			4	629	10	730	36	3,794	22	1,375
Contra Costa					28	2,452	31	3,402	10	323
Del Norte										
El Dorado						1,118		530		
Fresno					321	49,579	287	32,438	276	20,566
Glenn	1	22			44	3,449	45	2,736	54	2,089
Humboldt										
Imperial				290		1,877	1	704	1	635
Inyo										
Kern					711	114,248	787	66,960	434	36,441
Kings					136	14,677	120	12,235	5	391
Lake					2	69	1	49		
Lassen					17	934	21	1,452		
Los Angeles			1	56	436	34,648	438	34,734	415	21,282
Madera					87	11,435	45	4,162	17	1,039
Marin			4	161					12	
Mariposa										
Mendocino	1	17							5	17
Merced					284	21,411	106	19,542	80	4,676
Modoc	1	68	1	48	4	1,075	4	1,070		
Mono										
Monterey					45	3,745	52	5,086	39	2,855
Napa					21	1,413	27	2,081	7	327
Nevada					7	595	7	595		
Orange	20	1,180	18	1,990	170	19,181	155	16,216	49	1,569
Placer	1	144	1	204	36	3,310	21	1,776	48	2,260
Plumas										
Riverside	7	1,318	3	566	254	22,404	233	18,355	120	9,450
Sacramento					46	2,855	44	2,737	23	795
San Benito					28	2,842	23	1,851		
San Bernardino	50	9,483	29	14,873	313	28,530	367	31,944	279	15,774
San Diego		500			74	9,297	66	7,629	62	2,492
San Francisco										
San Joaquin					76	6,156	123	12,255	172	12,857
San Luis Obispo					61	6,144	54	6,319	56	5,037
San Mateo					6	451	6	488		
Santa Barbara					14	1,360	16	1,227	38	1,501
Santa Clara					52	4,640	51	4,598	11	267
Santa Cruz					25	2,673	13	1,841	18	1,438
Shasta	22	1,720	18	1,636	60	5,672	69	5,652	41	2,183
Sierra										
Siskiyou	19	692			2	977	11	653	4	328
Solano	3	280	3	97	81	8,254	42	2,932	75	5,337
Sonoma					65	3,286	51	3,320	44	2,552
Stanislaus	5	869	2	334	142	17,604	51	5,241	70	7,457
Sutter	25	5,625	3	504	149	14,555	82	7,522	103	6,246
Tehama					41	3,115	32	2,007	23	1,188
Trinity										
Tulare					149	27,658	105	21,223	35	5,389
Tuolumne					1	300	2	372	3	14
Ventura					119	12,135	79	6,597	25	2,206
Yolo					189	13,427	165	11,213	399	23,535
Yuba					34	2,337	32	2,057	6	304
Totals	167	23,748	88	21,453	4,150	491,039	4,032	379,281	3,252	207,757

Bureau of Field Crops

V. O. WOLCOTT, *Chief*
WILLIAM L. HUNTER, *Assistant Chief*

The Bureau of Field Crops performs services in four categories under provisions of the Agricultural Code:

(1) Field Crops Inspection, Division 5, Chapter 4; (2) Commercial Feeding Stuffs, Division 5, Chapter 7a; (3) Agricultural Warehouses, Division 6, Chapter 5; (4) Public Grain Warehouse Inspection, Division 6, Chapter 5a.

The bureau also provides, in the San Francisco Bay area only, the Terminal Weighing Service established under the Business and Professions Code. All activities are supported from special funds collected under laws which established the functions. Facts relating to revenues and expenditures are contained in the financial statement of the department.

Offices and laboratories are maintained at Sacramento, San Francisco, Oakland, Los Angeles, Vallejo, Petaluma, Fresno and Imperial (seasonal).

Each function of the bureau will be discussed separately in this report.

Field Crops Inspection

The department has adopted the uniform standards established by the secretary, United States Department of Agriculture, for use in this work. These standards fall into two categories: those under the United States Grain Standards Act, covering all grains, flaxseed and soybeans; and those referred to as permissive standards, covering rough rice, milled rice, hay, dry edible beans and peas. Inspection and grading in accordance with these standards is performed under license and supervision by the United States Department of Agriculture.

Additionally, the bureau determines quality factors on a number of field crops for which no official standards have been established. These crops are hops, safflower seed, castor beans and sunflower seed.

All services are performed upon request, and the applicant pays for them in accordance with a schedule of fees set forth in regulations. The fees collected must, according to law, be sufficient in the aggregate to pay the cost of the services. They are revised as needed to meet this requirement. Such a revision setting forth new fees became effective July 1, 1956.

The practice of buying and selling field crop products on the basis of graded quality is steadily growing. The data in Table 1 indicates the products covered and the amount of services rendered.

TABLE 1

Inspections for the Past Three Years of Field Crops Commodities

Commodity	1953	1954	1955
Corn	4,041	4,388	5,030
Wheat	6,407	5,902	6,843
Oats	816	667	512
Barley	13,580	22,005	20,409
Grain sorghums	1,791	2,528	3,622
Rye	34	26	7
Flaxseed	2,363	3,613	5,456
Rice	12,995	10,704	12,064
Beans	5,819	6,274	6,214
Dried Peas	90	107	52
Hay	946	698	556
Miscellaneous	1,333	2,485	3,264
Hops	467	437	348
Totals	50,682	59,834	64,377

Commercial Feeding Stuffs

Manufacturers of commercial feeding stuffs are required to be licensed; and must label their products to provide certain minimum or maximum guarantees and a statement of ingredients. They may and frequently do make additional guarantees not required by law, where useful to describe the product. All claims, whether required or optional, must according to law be statements of fact.

The principal regulatory effort with regard to commercial feeds is examination of guarantees and other representations. Because of the nature of the work, technical services are the basis of control. Chemical analyses and biological assays are the means of determining truthfulness of most claims. The field services of inspectors who gather

Dry beans being unloaded for export at the Port of Stockton. All field crops shipped to foreign countries are inspected and graded by the Bureau of Field Crops which maintains offices at this and other ports.

samples, information, and carry on the frontline enforcement effort are an essential complement.

Feed control has been in a state of progressive change for a number of years, particularly since 1950. Industry efforts to put into operation new concepts of animal nutrition and general husbandry have broadened the use of chemical additives as supplements to natural feed ingredients. Many of these materials not long ago were laboratory curiosities, and the supply was used mostly in experimental work.

Production of vitamin, trace mineral, antibiotic and other preparations is now great enough to permit their economical routine use in formula feeds. This is a standard practice to assure nutritional adequacy of animal rations. As a result, the number of ingredients contained in an average poultry feed, for example, has almost doubled. At the same time, problems of feed manufacture and feed control being closely related have enlarged in about the same proportion. There were increased demands upon the technology of feed manufacture which could not be met immediately. Such cases gave rise to regulatory difficulties. For example, an ingredient which is difficult to mix uniformly will be difficult to establish officially as present in the guaranteed amount. A large part of the added responsibility falls on the laboratory which must develop new methods of analysis or adaptations capable of testing minute quantities.

There is a compensation for these complications. Good nutrition of farm animals has become much more certain and, in many respects, simpler. Nutritional deficiencies are a great rarity. Medicated feeds control many former health problems. Much of the confusion between the areas of nutrition, health and management has been eliminated, and responsibilities lying in these fields are easier to identify. The result very much favors the consumer.

Table 2 summarizes the major activities on commercial feeding stuffs and provides a comparison with previous years.

TABLE 2

Statistics indicating the major activities by the bureau in commercial feeding stuffs for 1955, as compared to previous years are shown in the following table:

	1953	1954	1955
Licenses issued as of December 31st	3,181	3,107	3,025
Calls made by inspectors	3,441	3,120	3,432
Lots of feed removed from sale by inspectors	48	37	24
Consisted of, in bags	16,852	8,845	9,275
Hearings held in regard to violations	5	4	3
Laboratory activity			
Reports of inspection and general analysis	9,032	8,785	8,111
Vitamin assays	1,207	1,509	1,130
Analyses for inorganic nutrients and miscellaneous properties	1,261	1,226	1,263
Analyses for additives used for growth promotion or disease control	527	760	820
Biological evaluation tests (chick) of broiler fryer feeds	57	98	30
Biological evaluation tests (chick) of protein meals	78	67	52
Feeding trials in connection with consumer complaint studies	5	4	2

Agricultural Warehouses (California Bonded)

Privately operated services which assure good, safe storage have almost replaced this function, which provides for the optional licensing and bonding, under the Agricultural Code, of warehouses storing agricultural products. This activity of the bureau is now only nominal.

Seven warehouses, with a total capacity of 42,000 tons, were under license at the end of 1955.

Public Grain Warehouse Inspection

The bureau registers and inspects grain warehouses which regularly store grain for the public. At least one inspection is required to be made each year to determine the extent of insect infestation in the stored grain. The fees collected under the law are sufficient to provide for only one inspection, and it is performed in the spring as the insects become active. Grain found to be infested to the extent that it constitutes a menace to other grain is required to be fumigated or removed.

There were 269 warehouses registered at the time of the annual inspection in 1955.

The following data summarizes the results of inspection in the past three years:

	1953	*1954*	*1955*
Tons of grain examined	45,796	109,173	260,422
Tons of grain condemned	4,314	4,554	11,652

Bureau of Plant Pathology

GILBERT L. STOUT, *Chief*

GEORGE E. ALTSTATT, *Assistant Chief*

The Bureau of Plant Pathology is concerned with regulatory aspects of plant disease prevention and control. Its work, carried on under the provisions of the California Agricultural Code, involves detection, diagnosis, control, suppression, eradication and prevention of the introduction and spread of infectious plant diseases. Some of the bureau's activities relate specifically to detection, evaluation and suppression of new diseases and their eradication when possible.

Since up-to-date knowledge of the results of research is highly essential to the success of the bureau's activities, staff members must keep currently abreast of new methods and developments in plant pathology through familiarization with the work of various research agencies, including the University of California, the United States Department of Agriculture, experiment stations of other states, industry and other countries. A working relationship in survey, suppression and eradication work for specific diseases is maintained with county departments of agriculture and the United States Department of Agriculture. Extensive field projects are operated in cooperation with these agencies, and diagnostic laboratories are maintained at Sacramento and Riverside. The bureau acts in a technical and advisory capacity for agricultural commissioners in county departments of agriculture and for seven other bureaus in the California Department of Agriculture, which include the Bureaus of Chemistry, Entomology, Field Crops, Fruit and Vegetable Standardization, Plant Quarantine (including Nursery Service), Rodent and Weed Control and Seed Inspection, and Shipping Point Inspection, all of which at one time or another have problems which involve plant diseases. Technical assistance and advice to these bureaus are rendered by plant disease diagnosis and by supplying information and recommendations concerning specific diseases. Such assistance and advice were given during the year especially to Nursery Service in various plant disease problems, in its strawberry plant certification program and in its development of a program for registration of cherry tree propagating stock sources; to the Bureau of Fruit and Vegetable Standardization in its seed potato certification program and in other plant disease matters; and to the Bureau of Plant Quarantine in its various plant disease quarantine problems. Field surveys, conducted in cooperation with counties and the United States Department of Agriculture to determine the distribution of certain plant diseases, provided information to the

Bureau of Plant Quarantine for establishment or modification of quarantine lines.

The number of specimens received in the laboratories during 1955 reached an all-time high of 5,594, an increase of 1,735 over the previous year.

The program for development of methodology for certification that fruit, nut tree and vine nursery stocks are virus-free, supported by federal and state funds on a matching basis, made further progress during the year; this activity has developed to the point where, in the near future, it is believed that cherry tree and grapevine propagating stock sources can be registered for freedom from serious virus diseases.

Cherry and grape nursery stock as sold to the consumer before long may also be certified for freedom from such diseases, if the program progresses as anticipated.

Further progress was made during the year in strengthening procedures for detection of virus diseases in imported plant materials destined for California. With the cooperation of the United States Department of Agriculture, the California Department of Agriculture, the University of California and the agricultural industries concerned, procedures are now established and in operation for applying transmission or index test methods for virus diseases to imported citrus plants, grapevines and species of Prunus. The procedures for Prunus species began operating during the year, and those for citrus and grapevines had been established previously.

There has been an increased interest, in the seed industry, for a program of certification of vegetable and field crop seeds for freedom from seedborne diseases. Considerable attention has been given to technical and procedural problems involved in the development of such a program. The bureau has been collaborating with Nursery Service, the Bureau of Rodent and Weed Control and Seed Inspection and with county agricultural commissioners in a consideration of the problem.

PERMANENT SURVEYS IN COOPERATION WITH COUNTY AGRICULTURAL COMMISSIONERS

By GEORGE E. ALTSTATT, *Assistant Chief of Bureau,* CARL W. NICHOLS and T. R. CARPENTER, *Associate Plant Pathologists*

Particular plant diseases either not present in California or present only in limited areas, may constitute a potential threat to California crops, if they should become established or, where already established, should spread to new areas of the State. In order to discover and eliminate incipient infections of such diseases, continuous surveys of California crops are maintained and are conducted by personnel from county departments of agriculture, assisted by and under supervision and coordination of permanent state survey plant pathologists.

European Canker of Apple

An apple orchard in Sonoma County was found which showed severe damage due to the European canker disease caused by the fungus *Nectria galligena* Bres. This disease, first reported in California in 1909, is known to occur on apple in Del Norte, Humboldt, Marin and Sonoma Counties. It has not previously been considered a serious disease of apple in California. A spot survey of 25 Sonoma County apple orchards showed that, although the disease was present in four, it was severe in only one.

Cherry Buckskin Disease

A survey of cherry orchards for the cherry buckskin virus disease was conducted in 13 counties. The disease had been found during previous years in Contra Costa, Monterey, Napa, San Joaquin, Solano and Sonoma Counties. The 1955 survey was made principally in counties where the disease was not known to occur on cherry, but where the western X-disease was known to occur on peach. Exceptions were Riverside and Santa Barbara Counties, where neither buckskin nor western X-disease was known to occur, and Contra Costa County, where both were known to occur. Since the buckskin disease on cherry and the western X-disease on peach and nectarine are considered to be caused by the same virus, and since certain counties are conducting a removal program for all western X-disease infected peach and nectarine trees, it was deemed necessary to determine

whether the virus was present in cherry trees in these counties. The entire commercial cherry acreage in Butte, Glenn, Placer, Santa Barbara, Stanislaus, Sutter, Tehama, Yolo and Yuba Counties was inspected. In Contra Costa County, the survey was limited to the Brentwood District where buckskin was not known, although western X-disease was known to occur. In Los Angeles County, the inspections were made in Antelope Valley, where a western X-disease infected nectarine tree had been found during 1954. In Santa Clara County, inspections were made only in the Mountain View-Sunnyvale District. In Riverside County, they were limited to orchards where fruit symptoms could be seen. Spring frosts there had reduced the cherry fruit crop in some orchards to the point where efficient inspections could not be made.

Throughout the 13 counties surveyed, 69,316 trees were inspected on 236 properties. Eighty buckskin infected trees were found in eight orchards in two counties. There were 77 infected trees found on six of 87 properties inspected in Placer County, and three infected trees were found on two of 26 properties inspected in Sutter County. This is the first report of the cherry buckskin disease in these two counties.

Other Virus Diseases of Cherry

In connection with the cherry buckskin survey, other virus and virus-like diseases were observed and recorded. Severe injury by the rugose mosaic virus was seen in 22 orchards in Placer County and in one Santa Clara County orchard. One rugose mosaic infected tree was found in Los Angeles County. In Placer County, where 8,836 trees were inspected on 87 properties, 78 trees on 22 properties were found infected with the disease. This is the first report of rugose mosaic of cherry in Placer County.

Trees showing symptoms of the mild rusty mottle virus disease were observed in Butte, Contra Costa, Los Angeles, Riverside, Santa Barbara and Santa Clara Counties. Necrotic rusty mottle, another virus disease of cherry, was observed in Butte, Contra Costa, Glenn, Placer, Santa Clara, Sutter, Tehama and Yolo Counties. Ring spot (a virus disease) and cherry crinkle (a disorder with virus-like symptoms) were found to be quite general in all counties where cherry trees were inspected.

A Virus-like Disease of Sweet Potato

A disease of sweet potato plants, which appeared to be of virus nature, was reported to the bureau by the agricultural commissioner of San Bernardino County during October, 1954. In order to obtain information on the nature, seriousness and distribution of the disease, examinations of sweet potato fields were made during the summer months of 1955 in 11 counties, including Fresno, Imperial, Kern, Los Angeles, Merced, Orange, Riverside, San Bernardino, San Diego, Tulare and Ventura.

Symptoms observed in the field included extreme dwarfing (shortened petioles and internodes); small, malformed leaves (triangular, fan-shaped or oval with finely serrate margins); foliage color generally light dull green, with young protected leaves showing a mottle or mosaic in shades of green which disappeared as the leaves matured; and fleshy roots which were small and few in number with shorter and fewer fibrous roots than in healthy plants.

The disease was recognized in 55 plantings on 41 of 45 properties examined and was seen in the Velvet, Key West and Porto Rico varieties, but not in the Jersey variety. Although it was not evident in the single planting examined in Imperial County, it was found in all other counties surveyed.

No transmission tests were made, but there were numerous instances of the disease in alternate plants in the row, indicating that such plants came from certain individual diseased roots in the seedbed. In transplanting, two men often work together, each placing every other plant in the row. No indication of plant-to-plant spread was observed in the field.

Broomrape

A survey of tomato and other fields was conducted in Alameda County to determine incidence of the parasitic plant, branched broomrape, *Orobanche ramosa* L. Twenty-four out of 104 tomato fields, comprising 3,723 acres inspected, were found to have broomrape parasitized plants. Two of these fields had a previous history of broomrape. Other fields not planted to tomatoes during the 1955 season, but on properties with a previous history of broomrape, also were inspected. Broomrape was found parasitizing hosts other than tomato on six out of 24 such properties which contained 598 acres.

Plants other than tomato found infected

The broomrape, *Orobanche ludoviciana*, which was found parasitizing tomato and elderberry plants in a field in Alameda County during 1955. This unusual parasite produces flowers and seeds but lacks chlorophyll and obtains its nourishment by union at its base with the roots of its host. It is yellowish to brownish in color with purple-tinged flowers. Two plants are shown. The one on the right united with an elderberry root which extends to the left and then in a circle in front of both broomrape plants.

with broomrape in 1955 were: hairy nightshade, *Solanum sarachoides* Sendt.; spiney clotbur, *Xanthium spinosum* L. ; rough pigweed, *Amaranthus retroflexus* L.; poison hemlock, *Conium Maculatum* L.; lambsquarters, *Chenopodium album* L.; biennal wormwood, *Artemisia biennis* Willd.; an unidentified mustard, *Brassica* sp.; and cultivated cucumber, *Cucumis sativus* L. The last four have not previously been reported as hosts for the branched broomrape.

The broomrape was found on lambsquarters and on cucumber by Stephen Wilhelm of the University of California. N. L. Jones of the Alameda County Department of Agriculture also found it on lambsquarters. John P. Hill of this bureau found it on the biennial wormwood.

Another broomrape, *Orobanche ludoviciana* Nutt., was found by J. V. Lonergan of the Alameda County Department of Agriculture to be parasitizing tomato plants in one field. This species, identified by Margaret Bellue, Weed and Seed Botanist, California Department of Agriculture, has been reported previously as a parasite of tomato in Wyoming, and elsewhere on tobacco. Plants of the families Compositae and Cactaceae have been reported parasitized by this pest in several areas of the United States, including Southern California.

Subsequent inspection showed the broomrape also parasitizing elderberry, *Sambucus glauca* Nutt., along the edge of the same Alameda County field, where Carl W. Nichols first found it on this host. It was not found on tomato or elderberry on any other property during the survey.

Internal Cork of Sweet Potato

The bureau participated with the Horticultural Crops Research Branch, United States Department of Agriculture, and the Mississippi State Agricultural Experiment Station in a nationwide survey of sweet potatoes to determine distribution of the internal cork virus disease. Under this program, sample lots of roots were to be collected and shipped to Mississippi State College for uniform storage to permit cork development before being examined for internal cork. One hundred sample lots, each containing at least fifty roots of a given variety and taken from a single property, were collected during October and November, 1955, with the cooperation of agricultural commissioners in the following counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, Kern, Los Angeles, San Bernardino, Riverside, Orange and San Diego. The samples, shipped via Railway Express to Mississippi, came from counties containing a total of approximately 11,000 acres of sweet potato plantings.

Chestnut Blight

Chestnut blight, a disease of chestnut trees caused by the fungus *Endothia parasitica* (Murr.) And. and And., was first found in San Joaquin County orchards during

1934. Since that time, annual inspections have been made by state and county personnel, and all infected trees have been destroyed under supervision of the agricultural commissioner. No infected trees were found among 1,182 inspected during 1955, the second consecutive year that no disease has been found.

Phymatotrichum Root Rot

During November and December, a survey of cotton and alfalfa plantings was started in the Imperial Valley to obtain further information on distribution of the root rot disease caused by the fungus *Phymatotrichum omnivorum* (Shear) Dug. Previous records of infection in this valley included four properties. The disease was found in cotton on one additional property. Further surveys are contemplated for 1956.

Other Surveys

Assistance was given by permanent survey personnel in the surveys for yellow bud mosaic, peach mosaic and yellow leaf roll diseases of peach trees. Instruction in the recognition of particular plant diseases was given to county agricultural inspectors.

Post-entry Inspections

Certain foreign plants may be imported into the United States and California under provisions of the Federal Nursery Stock, Plant and Seed Quarantine No. 37, provided the importer agrees to certain conditions, including a quarantine detention period during which the plants must be inspected for pests. Inspection of these plants for evidence of disease during the detention period is one of the functions of this bureau.

There were 41 lots of plants or plant materials imported into California under post-entry quarantine during 1955. Within these lots were 1,250 seedlings, 1,581 cuttings, scions or budsticks and 1,109 plants. Ninety-seven inspections were made of these and previously imported lots. Approximately 52 lots were found eligible for release.

PEACH MOSAIC

By R. L. McCLAIN, *Associate Plant Pathologist*

The object of the cooperative federal, state and county peach mosaic project in Southern California is to suppress mosaic disease in the infected area and to prevent its spread to other areas. Inspections were made in Los Angeles, Orange, Riverside, San Bernardino and San Diego Counties; mosaic-infected trees were found in all except Orange County.

Inspections covered 423,124 peach trees, 355,767 of which were inside the area under quarantine and 67,357 outside. A second inspection was made of 214,925 of these trees, of which 196,996 were inside the quarantined area and 17,929 outside. In nursery sales yards and growing grounds, an additional 53,805 host trees were inspected in the quarantined area and 25,016 outside the area. There were 1,064 mosaic trees found on 330 properties, of which 822 were on 261 properties during the first inspection and 242 on 127 properties during the second inspection. Only two mosaic trees were found outside the quarantined area. All mosaic trees found were removed. None were found in the immediate environs of nursery growing grounds or on the premises of nurseries and dealers handling peach mosaic host plants.

A summary of properties and trees infected, by counties, is shown in Table 1.

Table 2 shows results of mosaic inspections in Southern California, from beginning of the work in 1936 through 1955. The incidence of mosaic has remained fairly stable during the last three years.

Inspections in the area under quarantine were started April 25th; in addition to nursery sales yards and growing grounds and their environs, they included the following: in Riverside County, a complete inspection of the Calimesa and Beaumont-Banning areas and the commercial orchards and their environs in the Elsinore-Temecula area; in San Bernardino County, a complete inspection of the Yucaipa area and the commercial orchards and their environs in the Ontario and Lytle Creek districts; in San Diego and Los Angeles Counties, only commercial orchards and their immediate environs.

The first inspection of the quarantined area was completed June 3d. The second inspection, started June 6th, included all Riverside and San Bernardino County properties on which mosaic trees were found during the first inspection together with many orchards which had poorly developed

foliage during first inspection. Mosaic trees were found on 69 of the latter properties during the second inspection completed June 30th.

Inspections outside the quarantined area were started on May 2d and included the following: in Los Angeles County, all commercial and most dooryard trees in Antelope Valley and a zone one to three miles wide in the Monrovia-Arcadia-El Monte District, west of the quarantine line, plus two nurseries and their environs; in San Bernardino County, in the Mojave Desert, all trees along the Mojave River from Victorville to a point several miles west of Barstow, all trees in the vicinity of Hinkley and a spot survey of trees in Victorville, Barstow and Lucerne Valley; in Orange County, all trees in a zone one to two miles wide in the Fullerton-Placentia-Yorba Linda District which is south of the quarantine line. A second inspection was made of the Valyermo District in Antelope Valley (Los Angeles County) and one property near Hinkley in the Mojave Desert (San Bernardino County). Inspections outside the quarantined area were completed July 15th. The two mosaic trees found outside the quarantined area included one in the City of Baldwin Park (Los Angeles County) about two miles west of the quarantine line and one in the Mojave Desert near Hinkley, found by San Bernardino County inspectors who were scouting the area. The latter tree, almost 50 miles from the nearest previously known infection, was in a small, isolated orchard. No mosaic was found in the Valyermo District of Los Angeles County, where a single mosaic tree had been found in 1954.

TABLE 1 [1]

Summary by Counties of Peach Mosaic Inspections in Southern California in 1955

County	Inspected		Infected with mosaic		
	Properties	Trees	New properties	Total properties[2]	New cases (trees)
Los Angeles	4,188	70,321	1	2	2
Orange	1,923	6,239	0	0	0
Riverside	2,718	127,326	28	160	666
San Bernardino	4,992	178,815	27	155	361
San Diego	221	40,423	2	13	35
Totals	14,042	423,124	58	330[3]	1,064

[1] Figures compiled by U. S. Department of Agriculture.
[2] Includes properties infected in previous years and having new tree cases in 1955.
[3] Includes nine properties in Riverside County, 59 in San Bernardino County and one in San Diego County infected on second inspection but not on first inspection.

TABLE 2 [1]

Summary by Years of Peach Mosaic Inspections in Southern California for 1936 Through 1955

Year	Inspected		Infected with mosaic		
	Properties	Trees	New properties	Total properties[2]	New cases (trees)
1936	1,817	499,970	922	922	28,897
1937	20,414	750,689	574	1,258	34,239
1938	51,184	875,039	637	1,487	17,847
1939	54,033	736,448	479	1,410	8,372
1940	49,295	679,981	374	1,114	4,720
1941	55,221	653,045	279	856	3,994
1942	20,403	466,420	118	503	1,219
1943	6,870	396,574	54	410	1,113
1944	3,476	490,483	77	415	1,657
1945	5,680	505,278	106	348	1,062
1946	11,558	536,147	54	308	914
1947	11,212	573,979	49	205	729
1948	13,148	546,694	118	355	1,318
1949	16,032	497,794	207	570	2,527
1950	20,653	490,871	162	535	1,859
1951	17,854	477,213	236	621	2,470
1952	19,452	470,334	125	523	1,971
1953	19,562	451,597	63	345	1,048
1954	17,191	460,697	43	315	1,037
1955	14,042	423,124	58	330	1,064
Totals[2]	(429,097)	(10,982,377)	4,735	------	118,057

[1] Figures compiled by U. S. Department of Agriculture.
[2] Figures in parentheses include duplications.
[3] Includes properties infected in previous years and having new tree cases in the year represented.

The Plant Pest Control Branch, Agricultural Research Service of the United States Department of Agriculture, provided general administration of the work, a project office at Riverside, supplies and equipment including automobiles and trucks, clerical help and approximately 22 man-months of inspection personnel. The California Bureau of Plant Pathology provided local supervision of the work, technical assistance, partial transportation costs, travel expenses for inspection personnel and salaries of inspectors and supervisors for approximately 21 man-months. County departments of agriculture paid the salaries of inspectors for 23 man-months, assisted with work supervision and handled regulatory and law enforcement features of the program.

Plant pathologists of this bureau continued to assist with supervision of several plots maintained by fruit breeders to test stock of new stone fruit varieties for freedom

from peach mosaic virus, prior to release for movement to points outside of the peach mosaic quarantined area.

In addition to the Southern California acreage covered under this project, peach and nectarine plantings in 13 counties north of the Tehachapi Mountains were inspected for virus diseases, including yellow leaf roll, western X-disease and yellow bud mosaic; no peach mosaic was found among 3,499,028 trees inspected on 1,788 properties.

QUICK DECLINE (TRISTEZA) OF CITRUS

By R. L. McCLAIN, *Associate Plant Pathologist*

The object of state-wide inspection of orange plantings for the serious virus disease of citrus, known as quick decline or tristeza, is to obtain current information on the natural spread and distribution of the disease so that quarantine lines can be changed as necessary to prevent spread through the movement of infected budwood and nursery stock.

Inspection of orange plantings during 1955 covered approximately 50,000 acres of oranges in the following 10 counties: Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Tulare and Ventura.

In the area under quarantine, inspections were made of all orange plantings in districts currently defined in the quarantine as regulated (districts with little or no disease), and of approximately 40 percent of the orange acreage in districts currently defined as lightly infected, where inspections are now being made mostly on a biennial basis. Inspections in the area currently defined as heavily infected were limited to a few properties where particular information about the disease was needed.

Outside the quarantined area, inspections included all orange plantings south of the Tehachapi Mountains except those in Imperial County, approximately 30 percent of the acreage in Tulare County and all plantings in Kern and San Luis Obispo Counties. There were only about four acres of oranges in the latter county.

In the current regulated area, which includes a portion of the citrus in Ventura County, all of that in Santa Barbara County and a small district in the San Luis Rey Valley of San Diego County, no quick decline was found except in western Ventura County. Several additional declining trees were found there on a previously infected property located approximately two miles west of the City of Santa Paula. In the same general area, a single declining tree was found on another property which had no quick decline history. A transmission test on this tree is not yet completed. (The transmission test on the single tree found late in 1954 in the San Luis Rey Valley of San Diego County was completed in 1955 and the results were positive.)

In parts of the current lightly infected area, however, there was a decided build-up of the disease. In Ventura County, quick decline continued its rapid rate of spread in the Bardsdale and Sespe Canyon districts of the Santa Clara Valley, but relatively few diseased trees were found elsewhere in this valley. In San Bernardino County, the high incidence of the disease continued in the Bryn Mawr area, and a marked increase in rate of spread was noted in some nearby districts, particularly in the vicinity of Mentone. Many newly infected properties were found in Riverside County, where there was evidence of rapid spread in the Highgrove district.

In the heavily infected area, continued rapid spread was noted, particularly in western San Bernardino County and northern Orange County. Less rapid spread occurred in central and southern Orange County.

Inspection of citrus plantings for quick decline is made as a joint project of the Bureau of Plant Pathology and county departments of agriculture. Headquarters for the work is maintained at Riverside. The bureau provided general administration of the project, plant pathologists for technical assistance, seasonal and temporary help for orchard inspection and preparation of maps and records, and laboratory facilities for making tests used in the diagnosis of trees suspected of having quick decline. It also maintained a glasshouse used for diagnostic transmission tests and, during the year, started a field plot for this phase of the work. The counties supplied personnel for orchard inspection and helped to supervise the work. County departments of agriculture and county agricultural extension serv-

TABLE 3

Estimated Orange Acreages in Relation to Occurrence of the Quick Decline Disease and the Quarantined Area as of December 31, 1955

Based on Latest Available Crop Acreage Estimates for Year 1954

County	Acres of orange trees							
	Estimated in county for 1954*	In quarantined area					Outside quarantined area	
		Heavily infected area	Lightly infected area	Regulated area	Total number of acres	Percent of county acreage	Number of acres	Percent of county acreage
Los Angeles	25,099	20,074	5,025	0	25,099	100.0	0	0.0
Orange	49,335	46,726	2,609	0	49,335	100.0	0	0.0
Riverside	16,992	0	15,288	0	15,288	90.0	1,704	10.0
San Bernardino	28,005	7,092	20,913	0	28,005	100.0	0	0.0
San Diego	6,216	0	0	260	260	4.2	5,956	95.8
Santa Barbara	113	0	0	113	113	100.0	0	0.0
Ventura	19,433	0	9,393	10,040	19,433	100.0	0	0.0
Totals for the seven counties	145,193	73,892	53,228	10,413	137,533	94.7	7,660	5.3
Totals for all other counties	41,546	0	0	0	0	0.0	41,546	100.0
Totals for the State	186,739	73,892	53,228	10,413	137,533		49,206	
Percent of state acreage for 1954		39.5	28.5	5.6	73.6		26.4	

* From Acreage Estimates, California Fruit and Nut Crops as of 1954. California Crop and Livestock Reporting Service. Sacramento, California, June, 1955.

ices assisted in reporting trees suspected of having quick decline disease. Staff members of the Department of Plant Pathology, University of California Citrus Experiment Station, assisted in interpreting laboratory and transmission tests and, at times, in making these tests. They sometimes also assisted in the examination of diseased trees.

Inspection crews usually were composed of both state and county personnel. In most districts inspections were made on an orchard-by-orchard and tree-by-tree basis, so that all trees in the surveyed areas were seen. State plant pathologists examined all suspect trees and made the necessary tests for diagnosis.

Laboratory tests in connection with diagnoses were made of bark and rootstock samples from 222 trees. Bark examinations are made to determine whether there are microscopic symptoms of quick decline in the food conducting and storage tissues (sieve tubes and phloem parenchyma) of the rootstock in the region of the bud union. Rootstock identification tests are made to determine whether trees showing symptoms suggesting quick decline are growing on sour orange rootstock, which is susceptible to the disease, or on a tolerant rootstock such as sweet orange. Since mature trees on tolerant rootstocks are not known to be visibly affected by the quick decline virus, any trees in decline on such rootstocks can be eliminated as suspects and considered as affected by other causes.

Transmission tests from 85 orchard and dooryard trees were made in a glasshouse by making tissue grafts from suspected trees into Mexican lime seedlings and observing the lime seedlings for symptoms. This test was used in support of field examinations and laboratory tests, particularly in the cases of trees found in areas where the disease was not yet known to occur.

The work of the quick decline project during 1955 included a continuation of studies on the occurrence of the quick decline virus in certain hosts other than the commercial navel and Valencia sweet orange plantings. Surveys and transmission tests, conducted prior to 1955 in cooperation with the University of California to determine the extent to which the virus might be present in such hosts, were referred to in the annual report for 1954. Tests have now been made of 42 Meyer lemon trees and 26 Satsuma orange trees growing outside of the quarantined area. Thirty-five of the 42 Meyer lemon trees or 85 percent of those tested were found by the lime transmission test to be infected. Six of the 26 Satsuma orange trees or 23

percent of those tested likewise were found to be infected. The 35 infected Meyer lemon trees were in various parts of the State, some as far north as Butte and Glenn Counties. The six infected Satsuma orange trees were in four counties of Northern California: three in Butte County and one each in Glenn, Placer and Solano Counties. These studies indicate that Meyer lemon trees generally are infected even when not showing symptoms, and that many Satsuma orange trees also are infected, in areas where the disease has not yet appeared in other citrus plantings.

During 1955 an estimated 76 man-months were used in the activities of the project, 26 of which were supplied by the counties and 50 by the State. These figures are estimates of time used in all phases of the work, including local administration, supervision, tree inspection, laboratory and transmission work, technical assistance, preparation of records and reports, stenographic help and travel.

Estimates of the acreages of oranges, as of December 31, 1955, in the heavily infected, lightly infected, and regulated parts of the quarantined area, and outside of the quarantined area, are shown in Table 3. Approximately 74 percent of California orange acreage is now in the quarantined area. It is estimated that at least 98 percent of all quick decline-affected trees have appeared in that part of the area presently defined as heavily infected. The total number of orange trees which have ever been affected with quick decline in California is estimated at less than 4 percent of all orange trees in the State.

YELLOW LEAF ROLL OF PEACH

By ARCHIE SCHLOCKER, *Associate Plant Pathologist*

The program to suppress yellow leaf roll, a destructive virus disease of peach, was continued in cooperation with the counties. Approximately 3,443,388 trees were examined on 1,954 properties in 11 counties (Table 4). Properties where the disease was found, either during 1955 or previously, were given one or more reinspections during the season. A second inspection was made of 968,440 trees on 377 properties in Butte, Placer, Sutter and Yuba Counties. A third inspection was made of 208,982 trees on 56 properties in Butte, Sutter and Yuba Counties and 29,344 trees on nine properties in Butte and Sutter Counties were given a fourth inspection.

To date, peach yellow leaf roll has not been found outside of Butte, Placer, Sutter and Yuba Counties. The inspections in 1955 revealed 162 new tree cases of the disease on 45 properties in three counties (Table 4), an increase of 40 trees over 1954 due principally to a flare-up in a Sutter County orchard. However, the number of proper-

TABLE 4

Results by Counties of Inspections for Yellow Leaf Roll of Peach for 1955

County	Inspected		Infected with yellow leaf roll			
	Properties	Trees	New properties	Total properties*	New cases (trees)	Total cases (trees)
Butte	205	318,531	2	7	30	30
Los Angeles	3	17,837	0	0	0	0
Merced	195	369,352	0	0	0	0
Napa	35	7,511	0	0	0	0
Placer	2	21,680	0	0	0	0
San Bernardino	326	1,958	0	0	0	0
Solano	24	24,679	0	0	0	0
Stanislaus	172	475,283	0	0	0	0
Sutter	796	1,700,784	10	27	110	110
Tehama	54	74,309	0	0	0	0
Yuba	142	431,464	1	11	22	22
Totals	1,954	3,443,388	13	45	162	162

* Includes properties infected in previous years and having new tree cases in 1955.

TABLE 5

Six-year Summary of Inspections for Yellow Leaf Roll of Peach

Year	Inspected		Infected with yellow leaf roll			
	Properties	Trees	New properties	Total properties[2]	New cases (trees)	Total cases (trees)
1950	1,348	1,536,005	30	30	877	877
1951	2,104	3,391,424	44	70	1,029	[3]1,543
1952	4,043	6,244,662	51	96	1,008	1,008
1953	1,962	3,734,228	105	167	463	463
1954	1,544	3,049,894	16	40	122	122
1955	1,954	3,443,388	13	45	162	162
Totals[1]	(14,580)	(21,399,601)	259		3,661	

[1] Figures in parentheses include duplication.
[2] Includes properties infected in previous years and having new tree cases in the year represented.
[3] Includes 514 cases found in 1950 and still standing at inspection time in 1951.

ties on which yellow leaf roll was found for the first time was only 13, the lowest since the inspection program began. All infected trees were promptly destroyed under supervision of the county agricultural commissioners.

One hundred and twenty-five of the 162 infected trees were on 32 properties where the disease had been found prior to 1955. The remaining 37 trees were on 13 properties having no previous history of yellow leaf roll. The flare-up in Sutter County previously mentioned occurred in an orchard where 45 infected trees were found. T. D. Urbahns, County Agricultural Commissioner, called attention to the unusually high population of leafhoppers in this orchard. He immediately recommended that an insecticide be applied to suppress them. The insecticide was applied on the assumption that the leafhoppers were spreading the disease. R. F. Wilkey of the California Department of Agriculture and D. D. Jensen of the University of California collected specimens of the leafhoppers which were identified later as belonging to the species, *Fieberiella florii* Stal., one of the vectors of western X-disease in the Pacific Northwest.

Orchard inspections started May 16th and were completed by September 30th. In the 11 counties approximately 115 man-months were spent on tree inspections, of which 67 were contributed by the State and 48 by the cooperating counties. In addition, approximately 19 man-months were spent by the State on technical assistance, training of inspectors, clerical work, map making and administration; about nine man-months were expended by the counties in administrative and other activities concerned with the work.

A six-year summary of inspections throughout the State for peach yellow leaf roll is shown in Table 5.

WESTERN X-DISEASE OF PEACH

By ARCHIE SCHLOCKER, *Associate Plant Pathologist*

All peach and nectarine trees inspected for yellow leaf roll were also examined at the same time for western X-disease. County and state inspectors found 426 trees infected with western X-disease on 172 properties (Table 6). Included in the 426 trees were 352 newly-found tree cases on 155 properties. Sixty-three of the 155 properties with 122 new tree cases had no previous history of the disease.

As in previous years, there was no uniform state-wide tree removal program to suppress western X-disease. Nevertheless, infected trees in certain counties were promptly destroyed under supervision of local county agricultural commissioners. This procedure was followed particularly in counties where yellow leaf roll has occurred and in other counties where the incidence of western X-disease has been low. County agricultural commissioners reported that 277 of the 426 infected trees found have been destroyed.

Inspections in Sutter County uncovered

TABLE 6

Results by Counties of Inspections for Western X-disease of Peach for 1955

County	Inspected		Infected with western X-disease				
	Properties	Trees	New properties	Total properties[1]	Properties with new tree cases	New cases (trees)	Total cases (trees)[1,2]
Butte	205	318,531	8	42	33	49	91
Los Angeles	3	17,837	0	0	0	0	0
Merced	195	369,352	5	5	5	6	6
Napa	35	7,511	4	7	7	72	72
Placer	2	21,680	0	1	1	4	13
San Bernardino	326	1,958	0	0	0	0	0
Solano	24	24,679	12	12	12	30	30
Stanislaus	172	475,283	14	16	16	17	17
Sutter	796	1,700,784	18	64	59	139	148
Tehama	54	74,309	0	12	11	23	24
Yuba	142	431,464	2	13	11	12	25
Totals	1,954	3,443,388	63	172	155	352	426

[1] Includes properties infected in previous years and having new tree cases in 1955.
[2] Includes trees found in previous years and still standing at inspection time in 1955.

an unusual disease situation within a localized area, where 78 infected trees were found on four adjacent properties within a radius of about one-quarter mile. The trees almost without exception were young, averaging about eight years of age and had not shown symptoms prior to 1955. It was unusual to find such a high incidence of western X-disease in young trees. The orchards involved were in close proximity to an old cherry planting where cherry buckskin disease was known to occur. It has been shown that the buckskin virus or virus complex can be readily transmitted by leafhopper vectors from infected cherry into peach, causing symptoms of western X-disease in the peach. The distribution pattern of the disease within the four peach plantings suggested that the virus had spread from the infected cherries into the peach trees.

A six-year summary of inspections throughout California for western X-disease of peach is shown in Table 7.

TABLE 7

Six-year Summary of Inspections for Western X-disease of Peach

Year	Inspected		Infected with western X-disease				
	Properties	Trees	New properties	Total properties[2]	Properties with new tree cases	New cases (trees)	Total cases (trees)[4]
1950	1,348	1,536,005	226	226	226	706	706
1951	2,104	3,391,424	238	422	276	1,352	1,851
1952	4,043	6,244,662	142	381	305	1,050	1,690
1953	1,962	3,734,228	64	326	196	601	1,675
1954	1,544	3,049,894	[3]114	[3]307	[3]227	[3]540	[3]809
1955	1,954	3,443,388	63	172	155	352	426
Totals[1]	(14,580)	(21,399,601)	[3]847			[3]4,601	

[1] Figures in parentheses include duplication.
[2] Includes properties infected in previous years and having new tree cases in the year represented.
[3] Figures include one tree found during 1954 in Los Angeles County in the course of inspections for peach mosaic.
[4] Includes trees found in previous years and still standing at inspection time in the year shown.

PEACH YELLOW BUD MOSAIC

By ARCHIE SCHLOCKER and R. L. McCLAIN, *Associate Plant Pathologists*

Inspections for peach yellow bud mosaic were made in cooperation with county agricultural commissioners in 11 counties. Prior to 1955, the disease had been found only in El Dorado, Nevada, Placer, San Bernardino, Solano, Yolo and Yuba Counties. Discovery of five infected trees on two properties in Napa County during 1955 added that county to the infected list.

State and county personnel found 185 new tree cases on 36 properties in five of the 11 counties where the inspections were made (Table 8). In some counties where the disease occurs, inspections were not made in the known infected areas but were made outside of such areas to determine whether and to what extent spread had taken place.

Inspections in San Bernardino County were made in conjunction with the regular inspections for peach mosaic and included all peach and nectarine trees in the Cucamonga and Lytle Creek areas. Of the 40 new tree cases found, 38 were on six previously infected commercial properties. Two were in dooryard plantings, one of which had no previous history of the disease. All infected trees were destroyed under supervision of the county agricultural commissioner.

Placer County inspections, confined mainly to nursery growing grounds and their environs, revealed 110 new tree cases, 104 of which were on 17 properties where the disease was known previously; six were on two properties without previous record of yellow bud mosaic. No yellow bud mosaic was found on nursery properties or within their immediate environs.

No new tree cases of yellow bud mosaic were found in Yuba County during 1955. Inspections included all commercial peach and nectarine plantings in the Wheatland district. A second inspection of about 4,452 trees was made in the two orchards where yellow bud mosaic had occurred in 1954.

Inspections in El Dorado County revealed 25 new tree cases on five properties with no previous history of the disease and two infected trees on a previously infected property. Most of the newly found tree cases were in orchards or portions of orchards not previously inspected. Several trees suspected in 1954 to have the disease later showed conclusive symptoms during 1955.

TABLE 8

Summary by Counties of Peach Yellow Bud Mosaic Inspections for 1955

County	Inspected		Infected with yellow bud mosaic		
	Properties	Trees	New properties	Total properties[1]	New cases (trees)
Butte	35	23,019	0	0	0
El Dorado	41	9,530	5	6	27
Fresno	1	610	0	0	0
Napa	36	8,811	2	2	5
Nevada	3	731	0	0	0
Placer	111	69,264	2	21[2]	110
San Bernardino	802	31,084	1	8	40
Solano	6	7,774	0	1	3
Sutter	73	228,643	0	0	0
Yolo	2	8,388	0	0	0
Yuba	15	55,334	0	0	0
Totals	1,125	443,188	10	38[2]	185

[1] Includes some properties infected in previous years and having new tree cases in 1955.

[2] On two of the 21 properties in Placer County there were infected trees remaining from the previous year but no new tree cases were found in 1955.

During 1954 and 1955, cold injury to developing buds and foliage tended to mask diagnostic symptoms so that individual trees infected with the virus may have escaped detection at the time of inspection.

Inspections in Napa County resulted in finding five infected trees, four in a commercial orchard in Gordon Valley and one in a small, mixed planting located about four miles north of the City of Napa. This is the first official record of yellow bud mosaic in the county.

No new tree cases of yellow bud mosaic were found in Nevada County during 1955, although inspections included the property where two infected trees were found in 1954; however, frost injury to developing buds and foliage in many trees made inspection difficult and often impossible.

Two plantings on separate properties outside of the yellow bud mosaic quarantine lines in Yolo County were inspected, and no yellow bud mosaic was found. One planting was experimental and the other was located partly on the site of a former stone fruit virus test plot.

In Sutter County between April 7 and May 23, 1955, the entire commercial peach and nectarine acreage of the Bear River district was inspected. This represented about 16 percent of the county's total esti-

mated peach acreage; no yellow bud mosaic was found.

Butte County inspections, including about 8 percent of the county's total estimated peach acreage, covered commercial plantings in the Bangor, Biggs, Chico, Durham, Oroville, Paradise and Pentz districts; no yellow bud mosaic was found.

An experimental planting in Fresno County and one in Solano County, together with five properties in close proximity to the latter, were inspected. Although three new tree cases were found in the experimental block in Solano County, where the disease had occurred previously, none were found on the other five properties or in Fresno County where the disease never has been found.

VIRUS-FREE NURSERY STOCK

By H. KEITH WAGNON, *Associate Plant Pathologist*

A program was initiated in 1950 for the development of methods of certification to buyers that fruit, nut tree and vine nursery stocks offered for sale are free of serious virus diseases.* More than 40 virus diseases are known to infect the stone fruits in North America, and five are recognized in grapes in California. Some of these diseases are confined to relatively limited geographical areas, whereas others are widespread. Their occurrence in many instances is traceable to distribution in infected nursery stock or propagating material. The most feasible means of preventing further distribution of these diseases into commercial plantings is to eliminate them from the propagating source materials from which the nursery stock is produced.

As in previous years, the work was concerned largely with critical field examinations of propagating material source plantings, and in many instances their environs. This procedure was supplemented by indexing methods carried out in an isolated planting or plot of test trees. Although time consuming, index tests made on "guinea pig" trees and vines provide the only practical method known for making positive diagnosis of virus diseases in woody plants. Index tests made during the year involved the placing of 4,047 inoculations on 656 trees.

Efforts also were made to explore the value of laboratory tests as a more rapid method for diagnosing the presence of viruses in fruit and nut trees and vines. Of particular promise is a test consisting of the microscopic examination of grape cane tissues for the presence of certain anatomical structures which appear to be indicative of fanleaf virus infection.

A separate isolated plot has been established to serve as a repository for disease-free trees and vines from which working materials can be obtained for the work of the project.

Instruction and training in the detection and recognition of virus and virus-like diseases in nursery and propagating source materials were given to state and county inspectors, as well as to nurserymen. Meetings with county nursery inspectors and with cooperating nurserymen and breeders, both in conference and the field, were held during May and June.

Nurserymen have shown an increased interest in the development of special mother blocks for use as propagating material sources, compared with the use of orchards and vineyards maintained primarily for the production of fruit. Approximately 14 nurseries have now established or plan to establish mother block plantings for stone fruits and grape propagating materials. Two commercial growers with young cherry plantings are selling budwood for use in propagating nursery stock.

Throughout the work there has been continuing close cooperation with the United States Department of Agriculture, the University of California Agricultural Experiment Station, county agricultural commissioners, the California Department of Agriculture's Nursery Service, nurserymen, growers and horticulturists, including fruit tree breeders.

Commodities worked on during the year included almonds, apricots, cherries, peaches, nectarines, plums, prunes and grapes; the bulk of this work, carried on in 24 counties with 52 nurserymen, was centered in the San Joaquin and Sacramento Valleys.

* For this project state funds were matched with federal funds received from the Agricultural Marketing Service, United States Department of Agriculture, under provisions of the Agricultural Marketing Act of 1946.

Cherries

Although cherry budwood source trees known to be free of serious virus diseases are gradually increasing, the supply is still insufficient to meet the demand for most varieties. As yet disease-free sources have not been found for several early varieties. In the meantime the best available commercial sources of these varieties are being utilized. The University of California Agricultural Experiment Station continued to provide nurserymen with limited quantities of budwood. In cooperation with this department's Nursery Service and the University of California Agricultural Experiment Station, tentative plans have been formulated for a cherry tree registration and certification program. Initial index work for this program was started during 1955 with the beginning of index tests of propagating source trees of Bing, Black Republican, Black Tartarian, English Morello, Lambert, Mahaleb, Montmorency, Napoleon and Van cherry varieties. Each is being indexed on two trees respectively of Bing cherry, Montmorency cherry, Shiro-fugen flowering cherry, Italian prune and Elberta peach.

Inspections of cherry propagating sources included 10,292 tree examinations on 22 properties; 217 trees were found unfit for propagating use.

Peaches and Nectarines

Requests by nurserymen for the examination of peach and nectarine propagating sources greatly exceeded those for other stone fruits. This development was to be expected, since the quantities of peach and nectarine trees grown exceed those of other stone fruits. Tree-by-tree inspections involved 77,619 tree examinations on 154 separate properties; 2,394 of the trees inspected were regarded as unfit for propagative use.

Nurserymen in areas where yellow bud mosaic occurs continue to submit for inspection scion and budwood sources located in other areas where this destructive virus is not known to occur. Examinations of environs of their nursery growing grounds have shown the latter to be safely isolated from known instances of yellow bud mosaic.

During the field inspection of a variety trial plot which has a history of previous infection, three positive cases of yellow bud mosaic were found. Movement of stock from this trial plot is governed by specific quarantine regulations and related precautionary measures to prevent spread. Results of tests carried on by personnel of this project have demonstrated that this destructive peach virus may be retained in soil and transmitted to peach trees growing in the infected soil.

The status of peach budwood sources in the "peach bowl" area of the Sacramento Valley, where yellow leaf roll disease occurs, remains unchanged from 1954, although the incidence of spread of the disease to new properties during 1955 was the smallest recorded since discovery of the disease during 1950. Movement of propagating material from this area is restricted to varieties not available outside the area, and even then is allowed only under special permits and indexing procedures to assure freedom from the virus.

There were 304 tree cases of the so-called "false yellow leaf roll" virus disease of peach encountered in plantings designated as budwood sources. Available evidence suggests that this disease is being spread through infected propagating wood. As yet the disease has not been detected in growing nursery stock, but it has been found in two-year-old trees in commercial plantings.

Transmission tests of a number of source trees, diagnosed and reported in 1954 as having peach calico, have been shown instead to have a virus disease tentatively believed to be peach blotch. Examination of June-budded peach nursery stock propagated from known infected sources showed that mild symptoms of peach blotch may be detected in terminal growth late in August.

Peach necrotic leaf spot, a mild virus disease which has little effect upon a mature tree but which is of economic importance in the propagation of June-budded nursery stock, was encountered in 1,725 budwood source trees. Since symptoms of this virus cannot always be seen in mature trees but can be recognized readily in June-budded peach trees under California conditions, source trees free of the virus are being selected by checking their progeny trees in the nursery row during July and August. Observations have revealed that sometimes a very small percent of unbudded Lovell seedlings as well as budded progeny trees from specific source trees show symptoms of this virus. It seems possible, therefore, that the virus may pass through a low percent of seed from an infected parent tree.

Other diseases encountered in peach and nectarine propagating sources included 59 cases of peach calico, three western X-dis-

ease, 39 line pattern, eight so-called "peach stunt" and four tentatively diagnosed as almond calico.

Almonds

Nurserymen continued to request inspection of almond budwood sources. Such inspection work included 25,153 tree inspections on 36 properties; 277 trees were regarded as unfit for propagating use. Diseases encountered were ring spot, almond calico, almond bud failure or crazy top, and Drake almond bud failure.

Plums and Prunes

Greater emphasis than during previous years was placed on the inspection of plum and prune budwood sources. The work included 19,509 tree examinations on 61 properties; 757 trees were regarded as unfit for propagating use. Diseases found included line pattern, plum white spot, prune diamond canker, Italian prune leaf spot, Standard prune constricting mosaic and Tragedy canker. Diamond canker of French prune was encountered in 148 trees on four properties.

Apricots

Increased emphasis was placed on apricots, but the number of sources submitted by nurserymen is still small compared to the total number of trees propagated. Inspection of scion and budwood sources involved 7,156 tree examinations on 24 separate properties; eight trees were found unfit for propagating use.

Grapes

The work on grapes which was started during the 1954-55 Fiscal Year has been directed first toward obtaining a better understanding of the problems involved. It has included four rootstock varieties and 52 raisin, table and wine varieties. Inspections included 464,339 vine examinations on 105 properties distributed in 13 counties, with the result that 4,773 vines were found unfit for propagating use. Virus diseases encountered were yellow mosaic, fanleaf, yellow vein, white Emperor disease and Pierce's disease. Yellow vein was the most prevalent virus disease found. The high incidence of virus diseases resulted in the rejection of 13 plantings, including such varieties as Carignane, Canner's Seedless, Italia, Cardinal and Grenache. Four plantings each of Carignane and Canner's Seedless varieties showed an exceedingly high incidence of yellow vein virus. A rather high incidence of this virus also was found in combination with fanleaf in the Cardinal variety.

PLANT PARASITIC NEMATODES

By W. H. HART, *Associate Plant Pathologist (Nematology)*

Laboratory examinations of plant and soil material for plant parasitic nematodes increased greatly during 1955. Specimens from nematode surveys of nursery properties and from shipments of imported plant material accounted for a major part of this increase. The surveys were made in cooperation with the county agricultural commissioners, Bureau of Plant Quarantine port inspectors, and Nursery Service.

Plant and soil samples examined totaled 3,574. These are included in the 5,594 total specimens reported in the section on laboratory diagnosis. Of this number 1,165 specimens contained plant parasitic nematodes. Root-knot nematodes, *Meloidogyne* spp., were found in 559 samples, root-lesion or meadow nematodes, *Pratylenchus* spp., in 343 samples, and the burrowing nematode, *Radopholus similis*, in 175 samples.

Other nematodes commonly found in the specimen material included cyst-forming nematodes, *Heterodera* spp., in sugar beet, Brussels sprouts, cactus and rubber plant, *Ficus;* the bulb and stem nematode, *Ditylenchus dipsaci*, on narcissus, alfalfa, garlic and onion; the chrysanthemum nematode, *Aphelenchoides ritzema-bosi* on strawberry; and the citrus nematode, *Tylenchulus semipenetrans*, on citrus. Many other species of undetermined pathogenicity were found in root and soil samples taken from a variety of plants.

Three new root-lesion nematodes were recorded within the state in 1955. Two were collected in Orange County on rose nursery stock and preliminary identification was made by Orange County Plant Pathologist, R. B. Nesbitt. The first of these, *Pratylenchus scribneri*, was found in locally grown stock. This nematode is known to attack Irish potato tubers on the eastern seaboard, disfiguring the tubers by the production of small pustules or pimples. The

second species, *Pratylenchus brachyurus*, also known as *P. leiocephalus*, was recovered from rose plants shipped from Texas. It is reported to attack a number of annual crops in the southeastern states including cotton, corn, tobacco, peanut, bean and potato. The third species, *Pratylenchus zeae*, was recovered from roots of Anthurium from Louisiana. This nematode attacks corn, tobacco and other plants in the southeastern states.

The burrowing nematode, *Radopholus similis*, was determined in 1953 to be the cause of a serious citrus disease in Florida known as spreading decline. It also attacks avocado and a number of ornamental plants and weeds. The known host list of this nematode includes a wide range of plant species, genera and families. Records of the Bureau of Plant Pathology and the University of California indicated that the nematode had not been found in California in numerous samples taken from established citrus plantings examined for the citrus nematode and miscellaneous other nematodes.

A survey for this nematode in imported ornamental plants and in plants produced from imported planting stock was begun in California nurseries in 1954 and continued during 1955. Between September 21, 1954, and December 31, 1955, laboratory examinations were made of 1,556 samples. The samples represented in excess of 337,000 plants; 175 specimens were found to contain the burrowing nematode. Plants most commonly infected were Philodendron and Anthurium (family Araceae) and Musa (Musaceae), but the nematode also was found in Pothos (Araceae), Strelitizia and Heliconia (Musaceae), Cyperus (Cyperaceae), and ginger species (Zingiberaceae). It has not been found in established out-of-doors plantings of ornamentals propagated from imported planting stock.

Soil temperatures in many of California's citrus areas apparently are favorable to the burrowing nematode. Since this nematode constitutes a threat to the extensive California citrus industry, quarantine measures were considered to prohibit entry of infected or exposed plant material and soil from areas where the nematode is known to exist. Plants found to contain the burrowing nematode in California nurseries either have been destroyed or placed under hold order by county agricultural commissioners. Incoming shipments found infected have been returned to origin or destroyed.

A survey of strawberry plant nurseries during the year indicated a limited distribution in them of the root-lesion nematodes, *Pratylenchus penetrans*, *P. vulnus*, and *P. pratensis*. The spring dwarf nematode, *Aphelenchoides fragariae*, was not found in strawberry nursery plantings, although it was recovered from samples taken in a few plantings grown for berry production. This nematode continues to be of little importance in the hot interior valleys although injury has been observed on infested plants in cooler portions of the State.

Interest by nurserymen in the examination of soil from proposed nursery lands has continued to increase. Sixty-four soil samples were examined for proposed strawberry nurseries alone, as well as many more from fields being considered for diversified nursery plantings. In 344 soil samples examined, 130 were found to contain plant parasitic nematodes.

LABORATORY DIAGNOSIS

By C. G. WEIGLE and ALEX M. FRENCH, *Associate Plant Pathologists*

Diagnosis of diseases present in specimens submitted for examination is performed to assist county agricultural commissioners, other bureaus or agencies and growers. Specimens may originate locally or from interstate and intrastate shipments; others are brought in from the field by members of the bureau, but most are sent in by county agricultural commissioners and their staffs.

Of the 5,594 specimens submitted during the year, including those to be examined for nematodes, there were 5,320 specimens examined in the Sacramento laboratory and 274 in the Riverside laboratory.

Specimens intercepted at border stations by inspectors of the Bureau of Plant Quarantine accounted for 244 of the total. In addition to laboratory specimens, many specimens were examined and diagnosed in the field by members of the bureau.

Laboratory determination provides information pertaining to the kind and prevalence of diseases which either are present within the State or which come into the State on plants or plant products. Such in-

formation often is the basis for regulatory and quarantine action. Sometimes the findings reveal new or little known pests.

Diagnoses of more than usual interest included the following:

Two lots of strawberries from Oregon with root galls caused by *Synchytrium fragariae* Zeller and L. Campbell.

Monkey-puzzle tree, *Araucaria araucana* (Molina) K. Koch, with bleeding trunk cankers caused by *Botryosphaeria ribis* Gross & Dug.

Twigs of juniper, *Juniperus* sp., with cankers containing oospores of *Phytophthora* sp.

Mycelium and conidia of powdery mildew, considered to be *Sphaerotheca pannosa* Wallr., on Kelsey plum fruit.

Several instances of apricot fruits and cherry fruits infected with *Pseudomonas syringae* Van Hall.

Red-bay, *Persea borbonia* (L.) Spreng., with bacterial canker caused by *Pseudomonas syringae* Van Hall.

Red-bud, *Ceris occidentalis* Torr.; elm, *Ulmus* sp.; and yew, *Taxus* sp.; with Verticillium, *V. albo-atrum* Reinke & Berth., wilt.

Commercial planting of yarrow, *Achillea* sp., with stem blight caused by *Alternaria* sp.

Large shipment of bulbous iris from out of state infected with *Sclerotium rolfsii* Sacc.

Almond seedling leaves and twigs with powdery mildew, *Podosphaera tridactyla* (Wallr.) DeBy.

Rose root and crown rot caused by *Rosellinia necatrix* (Hart.) Berl.

Oleander, *Nerium oleander* L.; and *Choisya ternata* HBK infected with *Armillaria mellea* Vahl. ex Fr.

Chain fern, *Woodwardia* sp., with cankers at bases of petioles caused by *Glomerella cingulata* (Ston.) Spauld. & Schrenk.

Bacterial speck caused by *Pseudomonas tomato* (Okabe) Burk. on tomato seedlings in a southern county.

Bacterial wilt of alfalfa caused by *Corynebacterium insidiosum* (McCull.) H. L. Jens. in several fields in Imperial Valley.

Following is a classification of laboratory specimens based on the type of host plant and the causal factor involved. In some instances a specimen was found to be affected with more than one causal factor.

Crop category	*Number of specimens*
Tree fruits, nuts, and grapes	814
Vegetables	333
Flowers and herbaceous ornamentals	1,810
Ornamental shrubs and vines	354
Small fruits	1,410
Forest and shade trees	241
Cereal, forage, and field crops	160
Soils	364
Miscellaneous (turf, weeds, etc.)	108
Total	5,594

Causal factor	*Number of instances*
Fungi	749
Bacteria	146
Viruses	94
Nematodes	1,170
Parasitic flowering plants	3
Disease or condition not caused by organisms	750
Referred to other bureaus or agencies (insects, chemicals, etc.)	84
Disease-free or negative for specified examination	2,648
Undetermined	81
Total	5,725

Bureau of Plant Quarantine

A. P. MESSENGER, *Chief*
E. A. BREECH, *Assistant Chief*

The administration of laws designed to prevent the introduction and spread of agricultural pests is the primary function of this bureau. Under authority of the Agricultural Code, plant quarantine regulations relating to specific pests are adopted and enforced.

The headquarters office is at Sacramento, with field stations located at the three major maritime ports and on the 17 major highways at or near the borders of the State. Inspections at seven minor port stations are provided by county agricultural commissioners or members of their staffs. All inspectors at the principal ports and one at each of the other maritime ports are appointed collaborators of the Plant Quartine Branch of the United States Department of Agriculture, which empowers them to enforce its foreign plant quarantine regulations. This phase of the work is directed by a federal area supervisor located in San Francisco, who also supervises such work in the Pacific Northwest, Hawaii and Guam.

The maintenance of plant quarantine enforcement at interior locations in the State is provided by county agricultural commissioners and their staffs.

For purposes of this report, bureau activities are grouped in five categories: (1) administration, involving the adoption, revision or revocation of quarantine regulations; (2) maritime ports, pertaining to vessels and aircraft inspections; (3) border highway stations, covering inspections of vehicles and contents; (4) interior inspections, concerning work conducted by county agricultural commissioners; and (5) nursery service, which handles the licensing and inspection of nurseries.

ADMINISTRATION: REGULATIONS, AMENDMENTS AND REVISIONS

Cherry Fruit Fly Exterior Quarantine (Section 3256, C. A. C.)

This regulation was revised, effective August 25, 1955, to designate the entire State of Oregon an infested area. Also with this revision, an ethylene dibromide fumigation treatment was approved for fresh cherry fruits, on the basis of which cherries may be shipped to California from infested areas of other states under official certificate of treatment.

Sweet Potato Weevil Exterior Quarantine (Section 3257, C. A. C.)

Amendment No. 9 was issued, effective November 17, 1955, to add to the infested area the Counties of Conecuh, Monroe and Washington in Alabama; the Counties of Atkinson, Berrien, Bibb, Brooks and Ware in Georgia; and the Counties of Jones, Lincoln and Wilkinson in Mississippi, and to release from the infested area the Counties of Appling, Bacon, Baker, Charlton, Irwin, Jeff Davis, Lee and Terrill in Georgia.

Amendment No. 10 was issued, effective December 27, 1955, to add to the infested area the Counties of Leake and Rankin in Mississippi; the Counties of Clinch, Irwin and Long in Georgia; and the parishes of LaSalle and Lincoln in Louisiana.

Peach Mosaic Disease Exterior Quarantine (Section 3262, C. A. C.)

Amendment No. 7 was issued, effective December 27, 1955, to add to the area under quarantine the Counties of Comanche, Erath, Limestone and Upshur in Texas, and to release Rusk County in Texas from the quarantined area.

Plum Curculio and Apple-Blueberry Maggot Exterior Quarantine (Section 3266, C. A. C.)

This regulation was revised, effective October 2, 1955, to change the title of the regulation to include the blueberry maggot; to include the blueberry maggot in the list of pests quarantined against; to include fresh fruits of blueberry and huckleberry in the list of commodities covered which are

prohibited entry into California from the area under quarantine, and to exempt fruits which are frozen solid at time of entry into this State.

Khapra Beetle Exterior Quarantine Repealed (Section 3270, C. A. C.)

Because of the issuance of a federal quarantine, effective February 21, 1955, regulating the interstate movement of Khapra beetles and carriers thereof from infested properties in the States of Arizona, California and New Mexico, the California Khapra Beetle Exterior Quarantine was repealed, effective February 28, 1955.

Pickleworm and Melonworm Exterior Quarantine (Section 3270, C. A. C.)

This quarantine, issued September 2, 1955, and made effective on October 2, 1955, designated as the area under quarantine all states and districts of the United States. The regulation designated the infested area to be all states and districts east of and including the States of Montana, Wyoming, Colorado and New Mexico, and designated as the regulated area the States of Arizona, Idaho, Nevada, Oregon, Utah and Washington. Commodities covered by the regulation include all fruits of cucumber, muskmelon and cantaloupes of the genus *Cucumis*, squash and pumpkin of the genus *Cucurbita*, and watermelon, *Citrullus vulgaris*. Any of these commodities entering California from the infested area must be accompanied by a certificate evidencing treatment by approved methods. Any such commodities from the regulated area must be certified as a product of the state from which shipped and in which the pests quarantined against are not known to exist.

Peach Mosaic Disease Interior Quarantine (Section 3400, C. A. C.)

Amendment No. 1 was issued effective July 11, 1955, extending the western boundary line in the area under quarantine in Los Angeles County to include additional area in the vicinity of Baldwin Park.

White Pine Blister Rust Interior Quarantine (Section 3402, C. A. C.)

This regulation was revised effective October 7, 1955, to coincide with the provisions of an amendment to the Federal-Domestic White Pine Blister Rust Quarantine, made effective September 3, 1955. With this revision, Calaveras and Tuolumne Counties were added to the area under quarantine. Provision was made for issuance of certificates for the movement to points outside of the area under quarantine, of restricted pines used in reforestation work. Nurseries originating such shipments had to be judged adequately protected from white pine blister rust infection, as determined by the Federal Plant Pest Control Branch. All reference to control areas was deleted.

Yellow Bud Mosaic Disease Interior Quarantine (Section 3408, C. A. C.)

Amendment No. 1, issued effective December 15, 1955, placed under quarantine portions of the Counties of El Dorado, Nevada and Yuba, and extended the quarantine lines in Napa and Placer Counties.

Club Root Disease Interior Quarantine (Section 3413, C. A. C.)

Amendment No. 1, issued December 23, 1954, and made effective January 22, 1955, shortened the title of the regulation and the common name of the pest to club root disease. The area under quarantine was amended to lift the quarantine in San Francisco County, and to remove from the area under quarantine that portion of San Mateo County lying south and east of San Bruno-Crystal Spring Road and Skyline Boulevard. The quarantine lines were extended southward in the vicinity of Half Moon Bay, and an area in the vicinity of Bolsa Point was placed under quarantine. The list of commodities covered was amended to include all roots of host plants, used farming appliances, vehicles, machinery, tractors and field implements except hand tools. The restrictions were modified to permit movement, from an area under quarantine, of used farming implements, machinery, etc., only after disinfection or washing and steam cleaning. An infected property was defined to mean any property on which club root disease exists, or has been known to exist, until it is determined by the director that such disease has been eliminated therefrom.

Hall Scale Interior Quarantine (Section 3416, C. A. C.)

Amendment No. 2 was issued, effective December 15, 1955, changing the common name of the insect and the name of the regulation to Hall Scale instead of Hall's Scale. Provision was made for the issuance of certificates, during the period October 15 to March 15, inclusive, for reshipments

from the area under quarantine of dormant host trees produced outside of the area under quarantine, except that certificates may not be issued on such trees from any infested property within the area under quarantine unless fumigated and so certified.

Khapra Beetle Interior Quarantine (Section 3418, C. A. C.)

Amendment No. 1 was issued October 7, 1955, and made effective November 6, 1955, to delete the requirement of repeated inspections of treated properties before release from quarantine, and to delete the proviso for movement of untreated grain or seed from infested properties for feeding or planting.

The first supplemental list of infested properties, issued January 12, 1955, listed 57 property locations. This list was supplemented 46 times during the year; as of December 31, 1955, a total of 229 properties had been listed as infested, of which 101 had been treated and released during the same period.

Dissemination of Pests Through the Agency of Appliances (Section 3555, C. A. C.)

This section of the California Administrative Code, adopted pursuant to Section 126 of the Agricultural Code, was amended, effective February 18, 1955, to add Khapra beetle and walnut husk fly to the list of pests which may be disseminated through the agency of appliances, and to designate used bags and used bagging as appliances capable of disseminating these pests. The amendment prescribed fumigation schedules at atmospheric pressure or under vacuum, using methyl bromide.

PORT DISTRICTS

The inspection of passenger and crew baggage, stores and cargoes carried by surface vessels and aircraft arriving from foreign and offshore areas is provided at maritime ports. This procedure is conducted to determine if prohibited or restricted agricultural items are present. Prohibited material is rejected and destroyed or returned to origin. Restricted commodities must conform with entrance requirements or be rejected.

Shown here at the bureau's San Francisco office, inspection of a mail package containing fruit from Japan

From a total of 8,845 vessels and 2,593 airplane arrivals, 18,190 shipments of plant material were rejected. Pest interceptions taken from them, amounting to 12,557 lots, included the following:

Hawaiian Interceptions

Fruit flies	38
Bean butterflies	18
Green scales	16
Mango seed weevil	46
Pink bollworm	1
Bean pod borer	11

Foreign Interceptions

Fruit flies	14
Citrus white flies	4
Avocado seed weevils	1
Bean pod borer	1
Rice stem borer	14
Mango seed weevils	4
Citrus canker	94
Burrowing nematode	39
Golden nematode	7

Material from other states covered by state exterior quarantines were found contaminated with:

Citrus white flies	1
Pickleworms	12

Among important pests not covered by specific quarantines were Dialeurodes chittendeni, Fiorinia theae, Pulvinaria psidii and Rhagoletis suavis.

Air lifts of vegetables from LaPaz, Mexico, totaled 191 plane loads at San Diego and San Pedro.

Export sanitary certificates were issued 8,851 times, nearly 7,000 of which were prepared at San Pedro.

Permits to remove food stores were issued 527 times.

The presence of meat and animals was reported to the Division of Animal Industry, California Department of Agriculture, and the Animal Quarantine Branch, United States Department of Agriculture, concerning 1,872 interceptions on vessels and 321 on planes.

Ship inspections in ports of the counties of Humboldt, San Joaquin and Ventura were made 216 times; contraband was found on 67.

BORDER INSPECTION SERVICE

Border station records show continued increase in this phase of plant quarantine work in all districts. The northern border district, which includes Smith River, Redwood Highway, Hornbrook, Dorris, Tulelake and Alturas stations, and the Nevada border district, comprising Long Valley, Truckee, Meyers, Woodfords, Topaz and Benton stations, were affected considerably during December by unfavorable weather. However, both districts handled considerably more inspections than in 1954. The southern border district, which includes Fort Yuma, Blythe, Parker, Daggett and Yermo stations, encountered the heaviest increase in inspection work load—over one-half of all vehicles entering the State were inspected at southern border stations. Reports from all stations show a total of 4,119,720 vehicles inspected, which is an increase of 284,478 inspections over 1954. The increase was about equally divided between vehicles bearing California licenses and those licensed in other states.

A breakdown of the increase in traffic through border stations over 1954 shows 261,596 more automobiles, 22,060 more commercial trucks and 822 more buses. A total of 11,124,399 passengers were checked into the State in automobiles and buses, which represents an increase of 720,381 over last year. Of these passengers 1,030,479 entered by bus, an increase of 76,087 bus passengers over last year, and 10,093,920 entered in automobiles, for an increase of 644,294 automobile passengers.

Interceptions of plant material restricted or prohibited by quarantine regulations increased in direct proportion to the increase in traffic; 92,699 lots of fruit, plants or plant material were rejected for violation of provisions of the Agricultural Code or of federal or state quarantine regulations. Each lot of plant material was inspected for insect, disease or weed pests; 20,605 lots of insects, 11,794 lots of diseases and 634 lots of weed seeds, making a total of 33,033 lots of pests, were intercepted.

Among the more important interceptions of quarantined pests were cotton boll weevil taken 15 times; plum curculio, 50 times; sweet potato weevil, 13 times; citrus white fly, 25 times; pickleworm, 7 times; sugar cane borer, 3 times; pink bollworm, 9 times; European corn borer, 59 times; cherry fruit fly, 377 times; apple maggot, 328 times; walnut husk fly, 19 times; white horse nettle, 87 times; Canada thistle, 142 times; and Carolina horse nettle, 8 times.

Although many intercepted pests are not under direct quarantine, they might prove to be equally as expensive to control or eradicate. Among the more important of these pests were coconut scale, scurfy scale, acuminate scale, Putnam scale, tessellated scale, walnut mealybug, tea scale, cyanophyllum scale, Howard scale, lesser snow scale, pyriform scale, yanone scale, plum gouger, sugar cane borer, squash borer, walnut husk fly, Johnson grass, Klamath weed, dodder and puncture vine.

Border stations inspected a total of 91,903 trucks hauling produce, for compliance with standardization requirements. By far the greatest number of these vehicles were outbound, which totalled 64,894. Of these, 63,163 were accompanied by clearance certificates from point of origin. The balance of 1,731 was not certified and required inspection at the stations.

Inbound produce trucks totalled 27,009, of which 18,727 were accompanied by certificates from point of origin; 8,282 were not certified and required inspection at the border stations.

Imports of feed grains through border stations continued at a high level during 1955. Kinds of grain and total tonnage of each was recorded as follows: Milo, 197,950; wheat, 83,668; oats, 36,446; barley, 35,990; corn, 23,702; and other grains, 3,311.

Cooperative activities continue to play an important part in the functions of the

border stations. There were 32 agencies of the State or Federal Government with which the stations cooperated during 1955.

Final arrangements were made for sites for new stations at Alturas and Fort Yuma. The Alturas station will be located very near the old station. The new Fort Yuma station will be located approximately five miles west of the present station. Plans have been completed and contracts awarded for construction of these stations. It is expected these projects will be completed in early 1956.

Funds were appropriated for the purchase of a site and construction of a new station at Blythe. Arrangements for acquisition of the site are under way. This relocation was made necessary because of a realignment of the highway in the vicinity of the present Blythe station. The new proposed site is a short distance west of the present location. It is anticipated that plans will be completed and a contract awarded for completion of this new station sometime in early 1956.

Funds have also been appropriated to provide badly needed employee housing at the Benton inspection station. Plans are under way to acquire a suitable site near the Benton station, which is located approximately one mile north of the town of Benton, Mono County. It is anticipated that plans will be completed and a contract awarded for construction of these housing units sometime during the summer of 1956.

INTERIOR (COUNTY) INSPECTION

Inspection of plants and plant products at mail, express, truck, rail, freight and air terminals at interior points is an important phase of plant quarantine enforcement in California. These inspection points are covered by the county agricultural commissioners and their inspection staffs, except in the Cities of San Francisco, San Pedro and San Diego. Interstate shipments to these three cities are inspected by personnel of state-operated maritime port stations.

All commissioners, deputies and inspectors holding valid certificates of qualification are state plant quarantine officers. In addition to enforcing laws, rules and regulations relating to plant quarantine, they certify to the pest conditions or treatments of California products, when such certification is required as a condition of movement within the State, or when required by other states or foreign countries.

An analysis of the summary of inspection, listed in Table No. 1, compiled from reports by the agricultural commissioners and the three state-operated stations, shows that 214,118 shipments from other states comprising 73,869,150 plants or units were inspected at interior points. Of these, 202,169 shipments representing 72,791,517 plants or units were found to be pest-free and were otherwise admissible; 11,949 shipments representing 1,077,633 plants or units were rejected because of agricultural pests or failure to meet quarantine requirements.

Important intercepted insect pests included Khapra beetle, citrus white fly, European corn borer, cotton boll weevil, sweet potato weevil and pickleworm, in addition to a number of scale insects and mealy bugs. Ozonium root rot, burrowing nematode and other nematodes were also intercepted on plants arriving at interior points. Animals intercepted included nutria and ground squirrels.

Inspection of 59,033 empty railroad cars disclosed 401 contaminated with cottonseed of undetermined origin, and 900 fouled with various other contaminated material such as corn cobs and seeds of various noxious weeds requiring cleaning, steaming or fumigation prior to re-use.

County agricultural commissioners had the added responsibility of enforcing state and federal Khapra beetle quarantines during 1955. In those counties where the beetle has been found, the enforcement problem is especially difficult. Policing the movement of Khapra beetle host material from infested mills and retail stores presented an unprecedented challenge in quarantine enforcement. The commissioners have performed an outstanding service in this type of enforcement.

TABLE 1

Report of Quarantine Inspections by Counties

County	INTERSTATE				INTRASTATE			
	Shipments passed	Plants or units passed	Shipments rejected	Plants or units rejected	Shipments passed	Plants or units passed	Shipments rejected	Plants or units rejected
Alameda	13,778	8,070,209	118	32,387	7,519	20,056,029	7	30,501
Amador	133	2,617			56	10,231		
Butte	2,095	173,627	72	4,227	896	418,687	49	44,813
Calaveras		No Report				No Report		
Colusa	266	8,242			315	61,123		
Contra Costa	3,591	365,967	24	1,038	2,381	935,706		
Del Norte	558	24,177	4	263	165	14,210		
El Dorado	513	20,864			147	65,319		
Fresno	1,366	147,877	7	87	5,358	2,835,015	8	631
Glenn	507	16,610	3	34	325	34,578	4	39
Humboldt	2,562	257,330	18	319	1,602	458,494	13	2,140
Imperial	2,289	207,429	1,095	33,305	321	121,732	27	1,398
Kern	2,956	466,241	34	1,078	4,360	1,485,016	37	2,693
Kings	238	2,131			62	55,349		
Lake	344	13,362	8	124	222	20,359	5	25
Lassen	418	11,057	2	201	143	21,966		
Los Angeles (Co.)	56,221	5,312,589	6,675	66,658	10,348	7,139,769	264	12,614
*San Pedro (Sta.)	4,450	894,133	130	2,142				
Madera	604	20,012	5	24	291	40,410		
Marin	1,872	198,573	6	35	1,011	236,576		
Mendocino	1,177	96,627	1	6	910	57,608	8	231
Merced	600	237,913	15	30	670	3,226,500	6	7,536
Modoc	401	34,952	9	1,726	46	15,958		
Monterey	1,045	64,267	58	3,800	918	7,363,197	7	372
Napa	987	124,011	5	47	1,325	2,374,215	2	23
Nevada	40	1,166			441	20,489		
Orange	3,682	648,016	545	43,316	7,579	9,154,314	57	477,637
Placer	654	435,137	9	1,058	590	320,594	5	6,658
Plumas	61	9,877			115	10,595		
Riverside	3,307	1,386,508	447	221,005	3,859	1,959,983	87	15,561
Sacramento	4,394	1,177,478	58	1,566	8,636	50,795,392	5	618
San Benito	83	180,705	3	3,104	105	205,828	11	24
San Bernardino	6,089	1,602,925	1,438	507,864	3,225	1,548,090	46	4,161
San Diego (Co.)	3,816	855,955	330	1,131	4,452	1,897,233	29	206
*San Diego (Sta.)	7,300	416,221	71	194				
San Francisco (Co.)	4	4,200	3	655	1,040	134,569		
*San Francisco (Sta.)	22,146	21,881,077	62	3,217				
San Joaquin	22,220	391,525	15	636	1,970	31,489,580		
San Luis Obispo	883	100,197	11	13	1,989	14,559,637	4	567
San Mateo	5,050	5,847,274	78	61,156	4,550	2,799,492	8	294
Santa Barbara	1,518	715,842	11	56	2,712	6,720,500	7	1,674
Santa Clara	4,672	4,917,409	86	74,899	3,454	45,886,192	55	132,345
Santa Cruz	1,668	6,566,998	50	1,227	2,505	13,031,330	6	264,607
Shasta	1,274	46,306	19	1,059	366	98,555	2	17
Siskiyou	1,519	237,286	18	507	330	176,454		
Solano	2,718	5,576,866	14	2,203	1,318	7,952,570	3	60,008
Sonoma	2,924	318,955	38	1,061	1,457	509,192	5	5
Stanislaus	1,866	317,067	226	2,667	1,361	1,734,980	31	2,115
Sutter	451	58,589	10	422	965	7,552,832	39	3,144
Tehama	1,034	20,685	77	77	417	116,601	1	400
Tulare	1,105	109,012	4	4	2,240	2,347,753	2	4,143
Tuolumne	29	252			38	10,353		
Ventura	1,449	407,279	23	290	11,341	18,737,025	146	3,293
Yolo	916	132,263	2	57	2,800	24,532,097	3	147,001
Yuba	326	1,657,630	12	658	394	1,781,775	95	422
Totals	202,169	72,791,517	11,949	1,077,633	109,640	293,132,052	1,084	1,227,916

* State-operated inspection stations.

NURSERY SERVICE

Nursery Service coordinates the nursery inspection work of county agricultural commissioners. A major function is establishing uniform inspection and clean-up procedures throughout the State. Optional programs are administered for the registration and certification of plants which have been inspected and indexed for virus diseases difficult to detect. Persons selling nursery stock are licensed, and grades and standards laws are enforced. The service is self-supporting from fees paid for licenses, registration and certification.

Plant Pest Inspections in Nurseries

The inspection of nurseries for insects, diseases and weed pests is a function of county agricultural commissioners. Regular inspections are made, and infestations found are required to be cleaned up to the satisfaction of the commissioner. In addition, surveys for specific pests are conducted in cooperation with Nursery Service.

A survey for virus diseases was made of 617 acres of stone fruit and grapevine nursery stock in the growing grounds of 76 nurseries. Thirteen different virus diseases or virus-like disorders were found. Trees found infected with serious viruses, including peach calico or peach blotch and peach stunt or Muir peach dwarf, were destroyed. Grapevines showing symptoms of fanleaf and yellowvein virus diseases were also destroyed. During the inspections, plants recognized as not true to variety were brought to the attention of nurserymen. Budwood and cuttingwood sources for nursery stock were also inspected for virus diseases by the Bureau of Plant Pathology with assistance from Nursery Service.

Training courses for the detection of virus disease symptoms were held in cooperation with the University of California and the Bureau of Plant Pathology for the benefit of nurserymen, county agricultural commissioners and their inspectors.

Inspections were made of approximately 635 acres of strawberry nursery stock. This acreage was more than double that grown in the previous year. The spring dwarf nematode, *Aphelenchoides fragariae*, was found in one nursery during a state-wide survey made in the spring. Root samples were taken from all plantings in the early fall for laboratory examination for nematodes. Approximately 100 acres were found infested with root knot or lesion nematodes. The plantings were also inspected at digging time. Red stele was found in only two of the growing grounds, and aster-yellows virus disease was not as prevalent as in the previous year.

Nursery planting in which foundation stock is increased and plants certified

Careful inspection at harvest time was given over one hundred fifty million tomato plants which were grown and shipped from Coachella Valley nurseries to tomato producing areas. Preplanting soil treatments and recommended cultural practices were generally followed by growers to protect the stock from nematode infestations. Very few rejections were made because of nematode infestations or other causes.

Greenhouses where indoor decorative plants are grown were inspected for the burrowing nematode, *Radopholus similis*. Infestations of this pest, which is reported as the cause of "spreading decline of citrus in Florida," were found in 31 nurseries. Infested blocks of stock were destroyed, and the soil in which the plants were growing

was treated. The pest was not found in citrus and avocado nurseries inspected.

What is believed to be fleck, a serious virus disease of Easter lilies, was found in a number of lily plantings in Del Norte and Humboldt Counties. Symptoms of this disease have not been observed except in a few instances in this lily-bulb producing area until this season. Plants showing symptoms were rogued by growers.

Crown-gall and hairy-root infections caused heavy losses to some growers of roses and deciduous fruit trees. In one planting, 30,000 roses were destroyed by the owner because of an unusually high percentage of infection. Losses of 50 percent of plants were reported in other fields where roses and fruit trees were grown. Research by pathologists, from the University of California has produced promising results for the future control of these pests.

In the inspection of nurseries, serious pests of limited distribution or pests new to the State are required to be eradicated when found. Prompt treatment of such infestations prevents spread to other stock or to other areas. The following list shows that 206 infestations of 19 different pests requiring clean-up were found in nurseries in 25 counties, by county and state inspectors:

Pests—Counties where found	*Number of infestations*
Aphelenchoides fragariae	
Spring dwarf nematode	
San Bernardino	1
Aspidiotus spinosus	
Spinose scale	
Los Angeles	1
Asterolecanium arabidis	
Pittosporum pit-making scale	
Butte	1
Contra Costa	1
Lake	1
Marin	5
Napa	1
Sacramento	3
San Joaquin	6
San Mateo	7
Santa Clara	2
Santa Cruz	3
Solano	1
Sonoma	2
Stanislaus	2
Chionaspis americana	
Elm scurfy scale	
San Diego	1
Ceroplastes rubens	
Red wax scale	
Los Angeles	2
Dematophora necatrix	
White root rot	
Santa Clara	1
Gymnaspis aechmeae	
Scale insect	
Los Angeles	1
Hemiberlesia palmae	
Tropical palm scale	
Los Angeles	1
Lecanium kunoensis	
Kuno scale	
Contra Costa	1
Malacosoma pluvialis	
Western tent caterpillar	
Los Angeles	1
Parlatoria oleae	
Olive scale	
Contra Costa	2
Fresno	17
Kern	39
Kings	9
Los Angeles	7
Madera	3
Merced	7
San Diego	1
San Joaquin	5
Stanislaus	3
Tulare	28
Ventura	1
Parlatoria pittospori	
Pittosporum diaspidid scale	
San Diego	4
Pseudococcus new sp.	
Mealy bug	
Marin	1
Pulvinaria sp. near *peninsularis*	
Scale insect	
Del Norte	1
Radopholus similis	
Burrowing nematode	
Fresno	1
Los Angeles	26
San Francisco	1
San Mateo	2
Santa Cruz	1
Trionymus diminutus	
Phormium mealy bug	
Marin	1
Toumeyella liriodendri	
Tulip tree scale	
Santa Clara	1
Virus diseases	
Peach blotch or peach calico	
Kern	1
Merced	1
Peach stunt or Muir peach dwarf	
San Joaquin	1

Noxious weed pests found in nurseries include: Canada thistle in Alameda and Sacramento Counties; hoary cress in Alameda and Santa Clara Counties; Klamath weed in Butte and Sacramento Counties; perennial sow thistle in Santa Clara County; Russian knapweed in Contra Costa County; and quackgrass in Alameda, Contra Costa, Humboldt, Marin, Napa, Sacramento, San Francisco, San Mateo, Santa Clara, Solano and Sonoma Counties.

Intercounty Nursery Stock Certificates

The director approved renewal of an agreement by county agricultural commissioners for the use of intercounty nursery stock certificates on shipments of nursery stock to 56 of the 58 counties within California. Shipments bearing the certificates, more commonly called "pinto tags," need not be held for inspection at destination.

Strawberry plant bed in which plants are indexed and approved as registered foundation stock

Certificates are being issued by 29 of these counties. There are 597 firms operating in 731 locations in the State authorized to use the certificates. This is an increase in the number of locations of approximately 10 percent over the previous year. The issuance by county agricultural commissioners and their use by nurserymen is supervised by Nursery Service.

Citrus Tree Registration

The registration of citrus trees found free of symptoms of psorosis, or scaly-bark, is to provide a source of budwood for the propagation of trees free of this disease. This optional program was started in 1937. New regulations governing the program were adopted in March, 1955. The fees were increased to cover increased costs of the work, and the period of registration was extended from three to five years.

The registry of citrus trees found free from psorosis, together with their location and the names and addresses of the registrants, is published annually. The total of 314 registered trees includes: 126 Valencia orange; 79 Washington navel; 62 Eureka lemon; 16 Lisbon lemon; 11 seedling lemon; 7 "Olinda" Valencia orange; 4 Rafferty lemon; 2 Frost nucellar lemon; 2 Marsh seedless grapefruit; 1 Prior short thorn Lisbon lemon; 1 Villafranca type lemon; 1 Bessey sweet orange; 1 navel nucellar orange; and 1 Campbell Valencia seedling orange.

Strawberry Certification and Registration

The certification and registry of strawberry plants is to provide a clean source of planting stock. Demand for certified strawberry plants has caused the program to grow rapidly. A total of 112 acres of strawberry nursery plantings were grown under the program. California Certified and Registry Certified Strawberry Plants produced from this acreage, during the 1954-55 season, totaled 26,115,000, an increase of 25 percent over the previous year. Certified plantings, made in the spring of 1955 for the following season's harvest, were increased to 160 acres. Part of this acreage was rejected from certification, because of the finding of root knot and lesion nematodes. One small mother bed was dropped from the program by the grower when the plants did not grow well.

Licensing

The number of licenses to sell nursery stock issued in the 1954-55 Fiscal Year was greater than in any previous year. The number of sales locations licensed in each of the past five years is as follows:

Fiscal year	*Sales location*
1950-51	5,978
1951-52	6,484
1952-53	6,328
1953-54	6,472
1954-55	6,676

Two persons were cited before county district attorneys for failure to pay license fees. In both cases the fees were paid and prosecution was not necessary. One application for a license was withdrawn following an investigation of the character and good faith of the applicant.

Testimony by one of our field men was given in the United States District Court, St. Paul, Minnesota, in a prosecution of a mail order firm for using the mails to defraud; the defendant was found guilty. The firm had formerly operated in California.

Grades and Standards

Proper labeling of nursery stock is required by law. Investigations were made of three complaints of improper labeling and one was upheld. In this case adjustment was made by the shipper, and the complaint dropped.

Inspections of packaged roses are made at retail outlets to detect dead and dying plants, improper labeling, and to advise on the proper care of perishable packaged plants. During the year a total of 297 stores

were visited. Approximately 7 percent of the roses inspected were found to be in a dead or dying condition and were removed from sale.

Other Services

The "Directory of Nurserymen and Others Licensed to Sell Nursery Stock in California" was published and distributed to the nursery trade and other interested persons.

The motion picture, "Nursery Practices in California," was shown to groups of nurserymen and inspectors. Excerpts were shown on television. Colored slides of plant diseases and insect pests were shown to county agricultural inspectors as part of our training program to aid field men in detecting insects, plant diseases and noxious weed pests.

At the request of segments of the nursery industry, plans were developed for registration programs for cherry trees and grapevines to be inspected and tested for virus diseases. The registered plants will provide clean sources of budwood and cuttingwood for the growing of nursery stock. Assistance in the planning was received from staff members of this department's Bureau of Plant Pathology, the University of California, the United States Department of Agriculture and interested nurserymen.

Assistance was given the Bureau of Plant Pathology and the University of California in testing effectiveness of hot water treatments on strawberry plants infested with nematodes. Some of the schedules used were effective and may be used in the future, when additional information on plant tolerance is developed.

Each year through the cooperation of growers, a census of fruit and nut trees and vines grown in California is prepared and distributed. Total trees and vines grown for market in the 1955-56 season greatly exceeded the production of the past several years. The deciduous fruit tree total was the highest reported since the census began in 1936-37. The census for the 1955-56 season is shown in the accompanying table.

TABLE 2

(Reported in thousands of trees or vines)

	1 year	Older	June buds	Fall buds		1 year	Older	June buds	Fall buds
Deciduous fruit trees					Deciduous fruit trees —Continued				
Apple	139		8	186	Quince	6			7
Apricot	293	3	11	354	Other kinds, fruit trees	121		79	137
Cherry	164			217					
Nectarine	156		366	150	Totals	2,614	27	2,560	2,883
Peach, canning cling	193		1,110	190					
Peach, shipping varieties	473		785	468	Nut trees				
Pear on pear	198	9	7	202	Almond	230		153	235
Pear on quince (dwarf)	16			15	Black walnut, seedlings	256	16		
Plum	386	3	173	437	Walnut (English) budded	139			
Prune	469	12	21	520	Other kinds, nut trees	26	31		
					Totals	651	47	153	235

	1 year	Older	Seedling rootstocks		All
				Grapevines	
				Raisin varieties	1,553
				Juice, wine varieties	390
Tropical and subtropical fruits				Shipping, table varieties	2,739
Avocado	137	25	179	Eastern varieties	71
Fig	73	85	5	Grafted, all varieties	69
Olive	17	22		Rootstock varieties, rooted	355
Other kinds	13	6	11		
				Total	5,177
Totals	240	138	195		

	Seed-bed	Lined out		Seed-bed	Lined out
Citrus rootstock			Citrus rootstock—continued		
Sweet stock	793	315	Tangelo	45	26
Sour stock	97	43	Trifoliata	42	50
Grapefruit	27	9	Troyer	116	95
Rough lemon	239	206	Other rootstocks	22	24
Mandarin	290	223			

Citrus fruit trees	One-year buds (Spring 1955, Summer 1954)						2 years and older	Total
	On-sweet	Sour	G. F.	R. Lem.	Tang.	Other		
Washington navel oranges	46	17		20	3	86	19	191
Valencia orange	51	6	1	11	1	39	11	120
Mandarin, tangerine, etc.	13			10		14	5	42
Eureka lemon	111	1	6	38	13	29	8	206
Meyer lemon	1			3		10	2	16
Other lemons	77	8	2	17	12	28	2	146
Marsh grapefruit	26		1	40		10	5	82
Limes	4			3		3	3	13
Miscellaneous citrus	9	2		33		6	4	54
Totals	338	34	10	175	29	225	59	870

Bureau of Rodent and Weed Control and Seed Inspection

WALTER S. BALL, *Chief*

The functions of the bureau continued to expand during 1955. Weed control in the State has shown an upward trend during the past year. In chemical weed control certain new systemic grass killers were introduced. There was an expansion in the use of existing soil sterilants and a definite interest in new products combining inorganic and organic compounds such as the borate-CMU mixtures. A great deal of interest has been shown in 2,4-D as a soil sterilant and this hormone type herbicide as a selective weed control material has continued to be of much importance. In 1954 there was very little trouble relative to 2,4-D drifting but in 1955 we again experienced trouble from spray drift, especially in the rice-growing areas where complaints were received relative to damage to tomatoes, cotton and other sensitive plants. Halogeton and camelthorn have continued to be of major importance insofar as cooperative state and county weed control programs are concerned. A great deal of attention has been given to the control of Russian knapweed, leafy spurge and gorse.

The field situation in rodent control continued on about the same level as last year's program. There continued to be a progressive evaluation of areas where field rodents are known to harbor diseases transmissible to humans. This re-evaluation conducted by continued surveys by the State Department of Public Health, this bureau, and county agricultural commissioners is dependent upon rodent population in relation to or in close proximity to areas of dense human population. No outstanding developments insofar as bubonic plague outbreaks in the State are concerned were reported during the past year. The newer rodenticides, the anticoagulants, have continued to be effective and have proved very practical in the control of the smaller rodents in residential and recreational areas. During the past year several rodent meetings were held for the instruction of inspectors actively engaged in rodent control work as well as the control of injurious bird species. The rabbit situation was not as serious as in 1954 but there have been numerous complaints relative to continued

damage in certain areas throughout the State. The muskrat situation has remained about the same although control procedure has been carried on in several sections and with the use of bait boxes it appears that some very satisfactory results are being observed. The bureau cooperated with the State Department of Fish and Game, the Department of Public Health and the county agricultural commissioners of Merced and Stanislaus Counties in surveying and analyzing the cause of deer die-off in those two counties. Our rodent control personnel as well as our weed and seed botanist spent a great deal of time in the area.

The control of predatory animals for the protection of livestock, poultry and certain crops, valuable game species and for the suppression of rabies and as an aid to game management continued to be conducted under the joint program of the California Department of Agriculture and the United States Fish and Wildlife Service in cooperation with 34 counties and the Tehama County Predator Association. The rabies situation became more acute during the past year with 164 positive cases of wild animal rabies which were recognized in 31 counties during the year. This represented the greatest number of cases to occur in California since 1916 and involved the widest distribution known during a single year. The wild animals included 138 skunks, 20 foxes, 3 bobcats, 2 bats and 1 raccoon. The number of predators taken during 1955 was 18,290 as compared with 9,850 in 1954. These predators included bear, bobcat, coyote, mountain lion, badgers, foxes, skunks, opossum and raccoon. In the case of the coyote and bobcat, based on the number of animals destroyed, the population of these two predators appears to be on the decline. During the year there were 355 bobcats and 829 coyotes less than the hunters accounted for in 1954.

Seed production continued to expand, with a resultant greater demand on the bureau with reference to the enforcement of the California Seed Law and the seed screenings regulation. The laboratory operated at full capacity during the peak season and it was necessary insofar as seed certification was concerned to send a few samples to commercial seed laboratories with a duplicate sample to be tested by our state seed laboratory. The seed certification program has continued to expand and again in 1955 alfalfa seed showed the greatest increase. A total yield of alfalfa seed of 85,440,000 pounds of cleaned seed was reported. Certified alfalfa seed increased from 40,000,000 pounds in 1954 to 59,112,303 pounds in 1955. Sudan grass seed showed a very definite increase of 40,500,000 pounds in 1955 as compared with 12,000,000 pounds in 1954.

The Los Angeles laboratory has handled the quarantine work of the southern areas which comprises all of the quarantine samples from the 10 southern counties to determine the presence of noxious weed seed.

WEED CONTROL

MURRAY R. PRYOR, *Field Supervisor of Weed Control*

Generally, all branches of weed control in the State showed an upward trend during 1955.

In chemical weed control there was ready acceptance of new systemic grass killers; expanded use of existing soil sterilant products and keen interest in new products combining inorganic and organic compounds such as the borate-CMU mixtures; much interest in 2,4-D as a soil sterilant material; and continued strong demand for hormone-type herbicides for selective weed control in small cereals. Attendant to the latter use, some trouble from spray drift was experienced in diversified farming areas, mostly in rice areas. Spray drift affected tomatoes, cotton and other sensitive crops.

County weed programs showed good progress with emphasis on eliminating noxious weeds of limited distribution and developing new approaches to control.

For the purpose of developing weed control recommendations bureau representatives conducted tests for the control of Canada thistle, Carolina horsenettle, leafy spurge, perennial peppercress, hoary cress, Russian knapweed, puncture vine, yellow star thistle, Bermuda grass, Johnson grass and Gaura.

Weeds surveyed by bureau members included distaff thistle (*Carthamus lanatus*),

Scotch broom (*Cytisus scoparius*), Marlahan mustard (*Isatis tinctoria* L.) and Halogeton (*Halogeton glomeratus*).

Newly Registered Herbicides

Weedazol (3-amino 1,2,4-triazole), an herbicide for the control of certain noxious perennials such as quackgrass, cattail, tule and other weeds was registered during the year with the Bureau of Chemistry.

Weedrench (Allyl alcohol), an herbicide for all weeds (except fleshy rooted ones) and weed seeds in nurseries, and Baron, known chemically as 2(2,4,5-Trichlorophenoxy) (Ethyl 2,2-D'chloroproprionate), and also by the trade name "Erbon" were also registered. Baron, described as a new nonselective herbicide, reportedly gives extended control of both broad-leaved weeds and grasses.

Other Herbicides

Trends in the use of hormone-type herbicides show greater use of low volatile esters of 2,4-D, particularly for selective weed control in cereals and for the control of woody plants; increased use of brushkillers (2,4,5-T plus 2,4-D) and less demand for 2,4,5-T; continued strong demand for the amine form of 2,4-D and decreased use of MCP.

Borates. Use of borates continued in normal demand.

Chlorates. As in previous years straight chlorate continued in lesser demand.

Borate Mixtures. Normal demand for borate-chlorate mixtures was maintained. The introduction of new borate products incorporating CMU and also 2,4-D was received favorably.

Carbon Bisulphide (CS_2). Carbon bisulphide continued in normal demand. At least 1,157,550 pounds of the material were used for the control of such deep-rooted perennials as wild morning glory and Russian knapweed principally in the following counties: Butte, Fresno, Madera, Kings, Merced, Orange, San Benito, San Joaquin, Santa Clara, Stanislaus, Tulare and Ventura.

Contact Dinitros. Demand for contact dinitros continued strong, particularly for seed curing of alfalfa clover, and flax.

Selective Dinitros. Downward trend. Some usage on flax and onions.

Aromatic Weed Oils. Continued in strong demand in northern California with large volume of use in San Joaquin Valley. Trend in southern California continues downward.

Selective Weed Oils. In the Imperial, Coachella and Salinas Valleys the demand for selective weed oils in carrots continued in normal demand. In the latter area the material was used for weed control in young celery and a pre-emergence spray for a number of crops.

Proprionic Acid Herbicides. Delapon[1] came into commercial use during the year and keen interest was shown in it for the control of Johnson grass, Bermuda grass and other grasses.

Ammonium Sulfamate. Moderate increased interest was shown in "Ammate"[1] for brush control, principally in areas where hormone weed killers are prohibited or dangerous to use.

Urea Herbicides. Recently introduced urea herbicides including CMU and DCMU show good acceptance for industrial and agricultural weed control.

Special Weed Problems

Austrian Fieldcress, *Rorippa austriaca*. The record for the current Austrian fieldcress operation in Modoc County shows that a total of 73½ acres of lightly infested meadow lands were sprayed with 148 pounds of 2,4-D (amine) at a cost of $472.13. Though eradication is not in sight there has been much progress on this 25,000-acre project since the program was undertaken in the late 1930's. A comparison of recent expenditures shows that the past annual expenditure amounted to about 10 percent of that of seven years ago.

Camelthorn, *Alhagi camelorum* Fisch. James W. Koehler, District Supervisor of Rodent and Weed Control, reports the camelthorn situation in Southern California:

"Satisfactory control work continued during the year in Kern, Riverside, Imperial and San Bernardino Counties. Discovery of a new small infestation of camelthorn about 1,250 square feet in size located on a railroad right of way, one quarter of a mile north of Lang Station in Soledad Canyon was reported to this department by the Los Angeles County Agricultural Commissioner's Office.

"Three additional aerial applications of the low volatile esters of 2,4-D were made at a rate of 4 pounds of 2,4-D in 10 gallons of water on the 180-acre camelthorn

[1] Trade name used solely for identification purposes.

Johnson grass control by geese in a Central Valley cotton field

infestation in Afton Canyon about 45 miles east of Barstow, San Bernardino County. This continues the treatment as outlined in last year's report and brings the total number of aerial applications to six. It is estimated that about 95 percent control of the camelthorn has been obtained and results are continuing to follow the pattern of test plot applications.

"Camelthorn control operations were also begun as outlined above, on the 10-acre infestation located in the Hinkley district several miles east of Barstow. This infestation was discovered in October, 1954."

In Northern California the situation is about the same as in former years with the exception of San Joaquin County where camelthorn was discovered along the San Joaquin River. The infestation extending over nine acres aggregates about one-half acre in size. The camelthorn on a dairy farm had been heavily grazed and produced little top growth until the area laid idle. Upon discovery the infestation was immediately treated with carbon bisulphide.

Canada Thistle, *Cirsium arvense*. During 1955 greater interest was shown in the control of Canada thistle and those engaged in this work are to be commended for their timely action as this difficult perennial has not yet become widespread. The plant by nature adapted to northern latitudes, has become well established in several of the dairy communities of Humboldt and Del Norte Counties and to a lesser extent in other localities in Northern California.

The situation in Mendocino County, where infestations are limited to four in number, portends well for the future. Greater emphasis was given to the control program in an attempt to hasten eradication. A similar situation occurs in San Joaquin County, where also the outlook for eradication appears promising.

An interesting development in Modoc County marks a new departure in control. All known infestations, totaling 4.9 acres, were treated with 2,4-D as a temporary soil sterilant. The chemical was applied at the rate of 80 pounds of acid equivalent per acre as the amine salt. Another new development of interest was the use of amino triazole as a foliage spray. Trials in San Benito and San Joaquin Counties gave favorable results.

Soil sterilant test plots for the control of Canada thistle, established at Quincy in November, 1954, by our bureau in cooperation with E. B. Bond, Agricultural Commissioner of Plumas County, show very good results, especially with compounds containing boron. Additional trials in 1955 included foliage treatments with 2,4-D (multiple treatment procedure).

Johnson Grass, *Sorghum halepense* L. Chemical and cultural methods have greatly reduced the extent of infestation in Imperial and San Joaquin Counties. In Imperial Valley Johnson grass infestations have been eliminated by frequent cultivation in intensively cropping and the use of chemicals. Re-invasion of such areas has been prevented by roadside and ditchbank sanitation. Where Johnson grass occurs in or-

chards and vineyards as in San Joaquin County, effective control has been obtained by the systematic use of geese supplemented by cultural and chemical methods.

Marvin Switzenberg, Weed Control Supervisor of the San Joaquin County Department of Agriculture, reports that in his district geese have proven their worth by cropping Johnson grass and other grasses out of broad-leaved crops. Conventional methods employed in the county include the use of chemicals, dry farming, flooding and the use of cover crops. A county-wide eradication program has resulted in Johnson grass being eliminated from 180 properties not counting innumerable ditchbank and roadside infestations.

Klamath Weed, *Hypericum perforatum.* Probably the most significant thing about the Klamath weed program is that there is little to report, which may be construed as a very favorable development for the problem does not have the importance it one time had.

Klamath weed, through the influence of biological control, continues to decline in all counties and the general situation is very satisfactory. At present it is not possible to forecast the density about which the weed will eventually fluctuate.

Leafy Spurge, *Euphorbia Esula.* Test plots exploring the control of leafy spurge were continued at Dorris, Siskiyou County. Multiple treatments with the low volatile form of 2,4-D as a foliage spray gave best results of selective materials tested. In comparative soil sterilization trials borates proved superior to sodium chlorate unit for unit of equivalent weight of boron trioxide and chlorate.

Perennial Peppercress, *Lepidium latifolium* L. Perennial peppercress, a relatively new pest now established in four counties, presents a difficult weed problem. The plant's rapid spread in diversified farming areas has complicated control. Where there is little likelihood of damaging sensitive crops, 2,4-D has proven an excellent control measure. Organized control programs are in effect in three counties. In each instance the county department of agriculture arranges with the property owner to do the control work. Stipulations vary somewhat but the general policy is for the official agency to furnish the equipment and the landowner the labor and materials.

In Stanislaus County 1,013 acres of infested lands were treated in late May and early June with the low volatile ester of 2,4-D, and 414 acres were sprayed in August. Generally, the control was very satisfactory and the project shows good progress.

The situation in San Joaquin County is encouraging. Though scattered, the infestations amount to only 10 acres in size. The agricultural commissioner's office in view of the favorable situation is devoting special attention to the early elimination of this pest. Methods of control included the use of 2,4-D and CMU-borate sterilants.

Solano County perennial peppercress infestations presently occur in alfalfa and permanent pastures. Control has been hastened by county crews assisting growers in treating infestations. Generally results have been satisfactory, but the spraying of the weed at Rio Vista during 1955 was disappointing. In this instance about 40 acres of perennial peppercress in a pasture was sprayed with 2,4-D. Subsequent grazing by livestock to a great extent nullified the effectiveness of the treatment.

Bureau test plots for the control of perennial peppercress were continued in Yolo County. Results show 2,4-D superior to silvex (2,4,5-trichlorophenoxyproprionic acid); 2,4-D low volatile ester better than 2,4-D amine; multiple treatments (three treatments per season) highly effective; two to four pounds of 2,4-D acid per acre as lethal dosages; one pound 2,4-D per acre suppressed seed production and one-half pound 2,4-D per acre was not satisfactory.

The tests also showed the plant to be highly resistant to borate and chlorate soil sterilants.

Puncture Vine, *Tribulus terrestris* L. Puncture vine has for years been one of the most troublesome and persistent weeds in the warmer regions of the State. One of the main difficulties of controlling it involves delayed seed germination. The seed, contained in five spiny burs, may germinate one at a time depending on soil moisture, and the others remain dormant until optimum conditions prevail. The usual procedure of control is to destroy the plant before viable seeds are formed. The spraying of the plant with a contact weed oil is a standard method.

Of interest is a new approach to control in Napa County. It involves a modified use of a soil sterilant with a dual purpose: (1) destruction of the plant by contact, and (2) inhibition of seedling growth by soil

sterilization. During 1955 the county department of agriculture compared a chlorate-borate mixture, as a spray, to the use of aromatic weed oil for the control of spot infestations. Comparable infestations totaling 32 miles of roadsides were sprayed in each instance. The material cost for the chlorate-borate mixture was slightly more than that of the oil, but the total cost was 45 percent less. In the case of the chlorate-borate treatment subsequent checks after initial treatment revealed no regrowth at all. Where the oil was used the first three checks revealed some regrowth.

Quackgrass, *Agropyron repens*. Current quackgrass test plots conducted by our bureau with the newer grass killers show highly satisfactory results. The following progress report is given by Richard H. Dana, District Supervisor of Rodent and Weed Control: "It appears that a 40-pound per acre treatment of Dalapon[1] on quackgrass when the plant is growing and there is sufficient moisture in the soil, will give excellent results (95 percent control). The program can be hastened by tilling the soil after treatment when the tops have died down. This can be followed up by spot spraying any regrowth with one-quarter pound Dalapon to the gallon of water. By following up with three or four of these spot treatments an infested area can be cleaned up."

Russian Knapweed, *Centaurea repens* L. An evaluation of the cooperative Russian knapweed plots established by the bureau at Mendota in 1954 shows the following: (1) multiple treatments of 2,4-D as foliage sprays during the summer are unsatisfactory, (2) late fall and early spring rosette treatments at four pounds of 2,4-D acid equivalent per acre show promise, and (3) high rates of 2,4-D leached into the soil by irrigation water gave effective control.

Other Weed Problems

Brush Control. An interesting project in Contra Costa County involves the county department of agriculture and a local flood control district. During the year six canals designated by the Flood Control Office as a potential flood hazard, were sprayed for the control of cattail, tule and woody plants by personnel from the agricultural commissioner's office. Spraying and burning of all debris in the channels helped reduce flood loss in the county. The cost of spraying canals amounted to a little over $8,000.

[1] Trade name used solely for identification purposes.

Distaff Thistle, *Carthamus lanatus*. Contemplation of outside assistance for the control of distaff thistle by one of the affected counties prompted a state-wide survey of the weed.

All known infestations were surveyed and a total of 1,225 acres of distaff thistle was found in four counties. Acreages by counties are as follows: Orange, 670; Los Angeles, 5; San Luis Obispo, 200; and Napa, 350.

The survey showed that patrolling had become a major phase of control operations in Orange and San Luis Obispo Counties. An appraisal of the findings further shows that the elimination of distaff thistle would be difficult. The scattered infestations, the difficulty of finding solitary depauperate plants, the occurrence of the new and unexplained plants in isolated areas, the ready spread of seed by prevailing winds, the steep and rough terrain, the frequence of overgrazing and abundant rainfall in most of the affected areas complicate control. The history of distaff thistle under our coastal conditions is characterized by plants slow to get started but once established spread rapidly with little warning.

Gorse, *Ulex europaeus* L. A brief summary of the gorse biological control project by James K. Holloway, Entomologist, Insect Identification and Parasite Introduction Section, Agricultural Research Service, United States Department of Agriculture, gives results for 1955: "The gorse weevils in Mendocino County are now in the third generation. It is quite easy to find adults in the immediate area of release, also on some plants several yards away. The populations have, however, not become sufficiently abundant to notice any appreciable damage to seed pods and evaluation of the effectiveness will have to be made following at least one more generation in the field.

Mediterranean Sage, *Salvia Aethiopis* L. During 1955 three new infestations of Mediterranean Sage were found in Modoc County, bringing to 32 the number of locations where the plant has been found. Most of the old infestations have been eliminated and the remainder are under a high degree of control.

In Lassen County a new infestation of about 40 acres was found at Bieber. Control by spraying, difficult on account of a debris-covered area, was supplemented by hand hoeing.

Scotch Broom, *Cytisus scoparius.* On August 29, 1955, the Board of Supervisors of Amador County passed and adopted an ordinance providing for the control and eradication of Scotch broom, *Cytisus scoparius*; Spanish broom, *Spartium junceum*; and French broom, *Cytisus monspessulanus.* The ordinance provides that it is unlawful for any person to plant or grow broom within the unincorporated area of the county. Authority is given the agricultural commissioner to make inspections of properties and remove or treat infestations at public expense. Refusal of permission by property owners constitutes a misdemeanor.

In the county during 1955, 53½ acres of broom was controlled on 259 properties. The work consisted primarily of controlling seedlings where old plants had been removed in previous years.

To protect valuable grazing lands in Shasta County a campaign against Scotch broom was begun within the year. According to Bruce Wade, county agricultural commissioner, the aggressive performance of the plant "in other parts of the State" prompted action before the local problem got "too big to handle." The project, a responsibility of the county department of agriculture, involves four minor infestations and a fifth which "extends 2½ miles along the bottom of a canyon near French Gulch." Annual control operations resulted in 98 acres of Scotch broom being sprayed. Material, including the low volatile ester of 2,4-D, labor, and other expenses totaled $782.50, or an average of $8.51 per acre."

Tansy Ragwort, *Senecio Jacoboea* L. Tansy ragwort, a perennial weed toxic to livestock, constitutes a weed problem in several of the north coastal districts. Rapid encroachment on dairy pastures and wild range lands has caused growing concern among farmers in the Smith River community of Del Norte County. Following several years of testing control methods, in which assistance was given by our bureau, large scale control by the county department of agriculture got under way in 1955.

Within the year 207½ acres of infested lands and six miles of roadsides were sprayed by county crews with 2,4-D at a cost of $341.43.

Halogeton glomeratus. The annual halogeton program in Lassen County is reported by Graham Randall, district supervisor of rodent and weed control, as follows:

"The halogeton control program was intensified during the 1955 season. This action was necessary because of increased area of operation and because of larger and heavier infestations. Climatic conditions were apparently ideal for maximum seed germination resulting in the above situation. The United States Department of the Interior, Bureau of Land Management, assumed the control program on all the public lands under their jurisdiction and will carry on the operation in the future.

"The acreage of halogeton controlled under the county-state program during 1955 was approximately 551. In making the retreatments necessary for complete control in some areas a total of 861 acres was as follows: 314 acres with 2,4-D, 228 acres with dinitro and weed oil emulsions, 200 acres sprayed by aircraft using 2,4-D and 119 acres controlled by hand hoeing or pulling. As in previous years the 2,4-D was effective until about August 1st when it was necessary to change to dinitro and oil for complete kill. In order for the control crew to keep pace with the halogeton, aircraft was used early in the season to spray 200 acres of cleared area which had become infested. Results were satisfactory except in the border areas where sagebrush protected the weed. Late in the summer, ground equipment was hired to spray approximately 200 acres with dinitro and oil. This was necessary to insure all areas were sprayed before setting seed.

"The Bureau of Land Management reported control on 1,000 acres of halogeton during 1955. Of this total, 600 acres were sprayed with 2,4-D, 300 acres with oil and dinitro and 100 acres controlled by hand hoeing.

"The Sierra Ordnance Depot carried out a control program on 75 percent of the 4,000 acres infested within their boundaries. The materials used were 2,4-D or oil and dinitro.

"Although there was an increase in the total acreage of halogeton under control during 1955, the over-all perimeter of the infested area did not increase. The additional acreage resulted from larger areas of known spot infestations and germination of scattered seed in areas adjacent to heavily infested areas. There was also considerable movement of seed by water during spring rains.

"The annual survey in the Alpine, Mono and Inyo county area was conducted by department personnel. Ranchers, forest

service personnel and other interested persons were contacted during the survey. No halogeton nor evidence of suspected or potential infestations were found."

Halogeton surveys were also made in the Counties of Kern, San Bernardino, Riverside, Imperial and Los Angeles by department and county personnel with particular attention being paid to locations where sheep known to have come from halogeton infested states were unloaded and driven to dry land or irrigated pastures.

The five-year longevity germination experiment of stored halogeton seed, conducted by the state seed laboratory, now is in its fifth year and shows interesting results. A surplus supply of original seed will provide for future tests.

Results of the longevity tests are shown in the accompanying table.

Pest Abatement Districts

The Big Valley Pest Abatement District in Lassen County assisted by the county department of agriculture treated 1,412 acres of district lands for the control of various noxious weeds. Our bureau in cooperation with these agencies established 20 test plots on hoary cress and Russian knapweed in the Bieber area. Heavy applications of 2,4-D were explored as soil treatments.

The Lookout and Stronghold pest abatement districts in Modoc County continued their respective weed programs. The Lookout district furnished materials and made equipment available to members for the control of hoary cress and other perennial noxious weeds. The Stronghold district continued its program of general weed control on canal banks.

Weed Meetings

The Seventh Annual California Weed Conference, held at the Carrillo Auditorium, Santa Barbara, January 26th and 27th was devoted to the discussion of what weeds cost, local weed problems, recent developments, special weed problems, and industrial weed control.

The annual halogeton meeting was held at Susanville on April 7th. Represented were the United States Bureau of Land Management, Sierra Ordnance Depot, California Department of Agriculture, the Department of Agriculture and Extension Service of Lassen County, the Nevada State Depart-

Longevity Test on Halogeton Glomeratus

Sample Contains Seeds With Both Papery and Indurate Bracts

	Seeds with papery bracts		Seeds with indurate bracts	
	Days in test	Germ percent	Days in test	Germ percent
1st test December, 1951	110	75	110	0
2d test June, 1952	18	90	110	0 (A few seeds with bracts removed germinated at once)
3d test March, 1953	20	12	136	0
4th test June, 1953	28	4	100	0 (Bracts removed from 50 seeds; 38 seeds germinated)
5th test January, 1954	10	All seeds dead and moldy. Test discontinued in 10 days	110	0 (Bracts removed from 10 seeds; 10 seeds germinated)
6th test June, 1954	18	All seeds dead	Test held 3 months	0 (Bracts removed from 50 seeds; 34 seeds germinated)
7th test August, 1955	43	0	114	0 (Bracts removed from 50 seeds; 33 germinated)

ment of Agriculture, and the Western Pacific Railroad Company. The purpose of the meeting was to coordinate activities of the above-mentioned cooperators in the Lassen County halogeton project.

Weed Control by State Division of Highways

The following tabulation by G. T. McCoy, State Highway Engineer, summarizes allotments made by the California Division of Highways for the control of noxious weeds and for fire hazard control along state highways during the Fiscal Year of 1954-1955:

A. Noxious weed control
   1. Work done by county agricultural commissioner under service agreement with Division of Highways—30 county agricultural commissioners, $47,666.50
   2. Work done by state highway forces, $30,474.50

   Total allotments, $78,141

B. Fire hazard control—by state forces

   Fire strip sprayed with CMU, 1,688.6 miles

   Fire strip sprayed with borate-chlorate compound, 301.8 miles

   Fire strip sprayed with sodium chlorate, 151.8 miles

   Fire strip disked or bladed, 1,451.8 miles

   Fire strip burned, 121.5 miles

   Total treated miles, 3,715.5

   Total allotment, $146,465.50

SUMMARY OF EXPENDITURES FOR WEED CONTROL

From Reports of 51 of the 52 County Agricultural Commissioners

Alameda	$9,423.49
Amador	7,148.81
Butte	—
Calaveras	73.47
Colusa	4,645.94
Contra Costa	4,236.72
Del Norte	313.90
El Dorado	113.30
Fresno	176.859.86
Glenn	83,223.91
Humboldt	8,809.10
Imperial	146.08
Kern	741.51
Kings	3,218.24
Lake	1,674.80
Lassen	9,178.85
Los Angeles	21,802.26
Madera	20,701.29
Marin	2,055.62
Mendocino	3,523.93
Merced	11,165.57
Modoc	6,661.18
Monterey	2,102.85
Napa	5,034.49
Orange	22,174.44
Placer	1,045.50
Plumas	3,270.97
Riverside	13,609.65
Sacramento	—
San Benito	14,684.18
San Bernardino	9,252.61
San Diego	23,403.11
San Francisco	—
San Joaquin	92,139.39
San Luis Obispo	14,507.60
San Mateo	3,506.86
Santa Barbara	9,874.56
Santa Clara	4,555.36
Santa Cruz	1,084.06
Shasta	14,448.25
Siskiyou	24,005.93
Solano	8,746.01
Sonoma	1,868.21
Stanislaus	44.879.47
Sutter	4.561.07
Tehama	8,554.15
Tulare	—
Tuolumne	11.429.27
Ventura	3.412.13
Yolo	27,170.43
Yuba	4,483.89
Total	$749,522.27

MATERIALS USED AND COSTS

Sodium chlorate	241,754 pounds
Borax	92,859 pounds
Borate-chlorate mixtures	193,000 pounds 42,271 gallons
Borate-2,4-D mixtures	58,556 pounds
Borate-CMU mixtures	18,711 pounds
Petroleum oils	698,611 gallons
2,4-D salts	6,042 pounds 18.399 gallons
2,4-D esters	2,314 pounds 4,774 gallons
Emulsive acid of 2,4-D	154 gallons
2,4,5-T	690 gallons
Dinitro	12,593 gallons
Carbon bisulphide	325,460 pounds
TCA	78 gallons
Arsenicals	464 gallons
Sulphur	10,246 pounds
Ammonium sulphamate	3,161 pounds
CMU and DCMU	40,728 pounds
MCP	475 pounds
Brush killer;	6.549 gallons
Proprionic acid herbicides	4,597 pounds
Amino triazole	460 pounds
Methyl bromide	550 pounds

The total cost for the above materials as reported by the county agricultural commissioners is $372,631.72.

PLANT IDENTIFICATION AND SURVEY

MARGARET K. BELLUE, *Weed and Seed Botanist*

During 1955 there were 1,725 plant identifications made; 1,408 were reported from Sacramento and 317 from Los Angeles. Information relative to growth performance, poisonous properties, probable origin and other pertinent information was supplied in connection with many of the specimens submitted.

The plants received for identification in connection with border quarantine interceptions included potentially propagable material of the following noxious weeds.

Noxious weed	*Shipments infested*
Cirsium arvense, Canada thistle	159
Solanum elaeagnifolium, white horse-nettle	95
Tribulus terrestris, puncture vine	29
Sorghum halepense, Johnson grass	17
Convolvulus arvensis, wild morning glory	13
Cenchrus pauciflorus, sandbur grass	5
Cardaria spp., hoary cress or whitetop	3
Solanum carolinense, Carolina horse-nettle	3
Centaurea solstitialis, yellow star-thistle	1
Cyperus esculentus, yellow nutgrass	1
Hypericum perforatum, Klamathweed	1
Sonchus arvensis, perennial sowthistle	1

The weed and seed botanist met with agricultural commission and veterinary groups to discuss problems pertaining to plants toxic to livestock, and made several field surveys in connection with stock-poisoning species. A paper was presented before the American Society of Range Management at Fresno.

The following weeds are of significance because they represent first records, extension of range, or encroachment of species previously considered innocuous.

Achyranthes repens L., sparingly adventive in Southern California, was reported as general in lawns and vacant lots about Oxnard, Ventura County. This is a prostrate perennial, native to Mexico.

Amaranthus deflexus L., low amaranth, which has recently spread extensively as a street and garden weed, was reported scattered along edges of an orchard in Ventura County.

Ambrosia trifida L., giant ragweed, was collected along the railroad track at Buena Park, Orange County.

Andropogon, glomeratus (Walt.) B.S.P., tawny beardgrass, although slow to become established, is persisting and steadily spreading in several new locations in the Sacramento area. Since it is avoided by all classes of livestock, this grass would prove a most obnoxious pest in permanent pastures.

Anoda cristata var. *digitata* (A. Gray) Hoch., crested anoda, is reported from a pear orchard, Cold Springs Road, Placerville, El Dorado County.

Bupleurum protractum Hoffmgg. and Link, round-leaved bupleurum, was received for identification from garden areas, Hawthorne Road, Laguna Beach, Orange County.

Cannabis sativa L., hemp or marijuana, was found growing in a yard on Beach Street, Los Angeles. Plant material also was submitted for identification from Glenn County.

Centaurea calcitrapa L., purple starthistle, was reported scattered over 20 acres of pasture land, Los Alamos, Santa Barbara County.

Centaurea sulphurea Willd., sulphur-flowered star-thistle. An illustrated article on the recent spread of this Mediterranean introduction was published in the bulletin of the Department of Agriculture Volume XLIV, No. 2. An additional record is an infestation at the north approach to the Folsom Bridge which was almost eradicated by road-building activities several years ago. This season the stand is re-established to the extent of scattered plants over about one-half acre.

Cotula australis Hook., Australian brass buttons, has long been regarded as a street weed about cities, but more recently has become a serious pest in lawns, being particularly aggressive and difficult to control in dichondra. It is prevalent in lawns in the Sacramento region and as far south as San Bernardino County.

Cuscuta pentagona Engelm., field dodder, occurring on dichondra, was determined by growing the dodder to the fruiting stage on *Hedera helix*.

Cytissus monspessulanus L., French broom, was submitted for identification from the Phillips-Edson Grove and elsewhere in the redwoods; also, on Soquel Creek, Santa Cruz County. This pernicious introduced shrubweed is gradually extending its range.

Euclidium syriacum (L.) R. Br. was collected in June at Bieber, Lassen County. This Eurasian member of the Cruciferae family is relatively new to California. It is recorded from Idaho and Washington.

Festuca elatior L., meadow fescue, has been submitted for identification from numerous new lawn plantings, with the complaint that it is a most undesirable turf ingredient.

Halogeton glomeratus C. A. Mey., halogeton, was collected at Benton Station, Bishop area, Inyo County, by Mr. Secrest, Santa Barbara botanist. The area is to be surveyed by members of the bureau during late spring, 1956.

Hoffmanseggia falcaria Cav., pignut, was submitted for identification from Santa Barbara County.

Holcus lanatus L., velvet grass, was reported an objectionable pest in a Sacramento lawn. This grass, sown as a pasture constituent and also naturalized to a limited extent, had adapted its growth form to lawn conditions and was maturing seed below the mowing height.

Kyllinga brevifolia Rottb., kyllinga, was submitted for identification as a weed from Orange County.

Panicum obtusum H. B. K., vine mesquite, was received for identification from San Diego, where plants were collected on the shoulder of Highway 395 between San Diego and Escondido. This is a tufted perennial with a knotted crown, stolons sometimes two meters long or more.

Paspalum dilatatum Poir., Dallis grass, is becoming increasingly prevalent as a lawn weed. New growth starts early in the spring, the widespread, prostrate "rosette" from the overwintering crown crowding out desirable turf grasses.

Pennisetum clandestinum Hochst., kikuyu grass, has been submitted from canned nursery stocks in the belief it was quackgrass. While not as difficult to eradicate as *Agropyron repens*, it could be quite objectionable in garden plantings.

Lepidium latifolium L., perennial peppercress, was reported from along the Santa Fe Railroad, one-fourth mile south of Galvan Overpass, San Juan Capistrano. Detection of this most persistent weed in several widespread sites at time of initial invasion has averted subsequent heavy control costs.

Lophophora williamsii (Lem.) Coulter, peyote, in a shipment of cacti from Laredo, Texas, was identified for narcotics officials in Los Angeles. Material was also received in the Sacramento office.

Oryzopsis miliacea Benth. and Hook, smilo grass, an introduced forage grass popularized some 25 years ago, is becoming rather widely naturalized in favorable sites almost throughout the State.

Orobanche ludoviciana Nutt., a root parasite, was submitted for identification from Centerville, Alameda County.

Polygonum argyrocoleon Steud., silversheath knotweed, was collected from near Placentia, Orange County.

Salpichroa rhomboidea Miers., lily-of-the-valley vine, was received for identification from Tehama, San Benito, Tulare, San Bernardino, and Riverside Counties.

Setaria verticellata (L.) Beauv., bur bristlegrass, was reported growing in canned nursery stock at Costa Mesa, Orange County. Because of the barbed awns on the seed head, this grass not only is spread readily but is mechanically obnoxious.

Silene cucubalus Wibel, bladder campion, has become established at a few scattered sites as on Sierra Madre Blvd., three-fourths mile east of Azusa Blvd., Los Angeles, northeast of Sacramento and in the vicinity of Santa Rosa. In some instances, it is believed seed of bladder campion was introduced as an impurity in birdsfoot trefoil seed.

Solanum sarachoides Sendt., hairy nightshade, was identified from the Patterson Ranch, Centerville, in connection with broomrape investigations.

Spartium junceum, Spanish broom, although not as aggressively spreading as *Cytissus scoparius* and *C. monspessulanus*, persists in small colonies in Northern and Central California and is currently reported from the headwaters of San Antonio Creek, Ojai Valley.

Thlaspi arvense L., pennycress, is submitted with increasing frequency from the Tulelake area.

Trifolium fragiferum, strawberry clover, is appearing as lawn weed in the Sacramento area. It is also reported from Anaheim, Orange County.

Poisonous Plants

Asclepias mexicana, Mexican whorled milkweed, was incriminated as a contributing factor in the general die-off of deer in the late summer of 1955 in southwestern Stanislaus County and northwestern Merced County.

The botanist, working with members of the Department of Fish and Game and the Stanislaus and Merced County Agricultural Commissioners, made field surveys in Garzas, Oristimba, Del Puerto, and Quinto Canyons. A high deer population and overbrowsed range existed in these areas where the heavy deer losses occurred.

Early in October, Mexican whorled milkweed in association with saltgrass, *Distichlis stricta*, constituted almost the only succulent vegetation available for many miles bordering the drying gravelly stream beds and water holes. At numerous sites critically examined by the botanist, the saltgrass had been eaten to the ground level and the milkweed had been browsed extensively. Deer were found dead in the immediate vicinity of such sites, some carcasses in a

position indicative of the symptoms known to precede death due to milkweed poisoning. Symptoms of affected deer observed on the range resemble those recorded for sheep which were fatally poisoned in milkweed feeding tests, and the histopathology of tissues taken from deer in the area parallels that described for sheep so poisoned.

Limited deer-feeding tests were conducted by the Department of Fish and Game using Mexican whorled milkweed plants collected in Del Puerto Canyon. A yearling deer confined with only milkweed available for food was found dead after 90 hours. Symptoms were not observed; the exact amount of milkweed consumed is not known. Dried ground milkweed (52 grams of leaves) was introduced into the fourth stomach of a fawn. Symptoms occurred after two hours; death occurred at nine hours. The symptoms observed simulated those seen in sick deer in the field, particularly the severe terminal convulsions and tetany. The histopathology of tissues taken from the animals which had died as a result of experimental feeding resembled that of two deer found in the Merced-Stanislaus die-off area.

Asclepias erosa, broad-leaved milkweed, included with straw, was suspected in the death of chinchillas in Southern California.

Astragalus douglasi, Douglas' rattle weed, was received for identification in connection with suspected poisoning of horses in Antelope Valley, Los Angeles County.

Cotoneaster sp. Fruits of this widely planted ornamental were eaten by a five-year-old Sacramento child who shortly thereafter became violently sick. These berries had been subjected to several heavy frosts. Cotoneaster is classed with a group of plants the fruits of which may give rise to the formation of hydrocyanic acid.

Datura stramonium, Jimson weed, was believed the cause of the serious poisoning of two boys, four and six years of age. The boys were observed to be dopey, as if drugged, and it was recalled later that they had been seen eating on the pods of this thornapple. The aid of a physician was promptly sought and the children responded to treatment.

Euphorbia ocellata, valley spurge has long been regarded with suspicion by sheepmen and each year from one to several reports are received incriminating this spurge in cases of disorders in sheep. The plant was received for identification this year from Panoche Valley, San Benito County, in connection with sheep losses.

Lactuca scariola, prickly lettuce, occurring in straw was received for identification in connection with a chinchilla loss in Riverside County.

Vicia spp., vetches. During the spring of 1955, vetch plants, in the early pod stage, which appeared to have been frost injured, were submitted in connection with livestock poisoning. Material was received from Modoc, Shasta, and Napa Counties.

RODENT CONTROL

LAUREL L. ATKINSON, *Field Supervisor of Rodent Control*

Control of Disease-bearing Rodents

The control of disease-bearing rodents in plague areas has continued at the same level as last year's program. Routine control was practiced in the same areas with the exception of several recreational zones.

District Supervisor James Koehler reports that the white-footed mouse (*Peromyscus*) population in the San Bernardino Mountain recreational areas increased to a very high level as compared to recent years. Much effort was expended by San Bernardino County personnel to control the outbreak.

District Supervisor Richard Dana reports that in the South Bay area the influx of human population has increased to such an extent that much of the suburban lands which were formerly pastures, orchards and crop land are now the center of new subdivisions and industrial development. The ground squirrels in these areas had formerly been controlled by use of toxic grain baits. At present in order to prevent the loss of pets in this heavily populated area it has been necessary to resort to use of fumigants. Carbon bisulphide and methyl bromide are now used almost exclusively.

In areas where rodents harbor diseases, the following operations have been carried on in cooperation with the United States Fish and Wildlife Service and the counties involved:

Area treated	1,322,951	acres
Strychnine bait	10,610	pounds
Thallium bait	1,352	pounds
Zinc phosphide bait	2,181	pounds
1080 (sodium fluoroacetate) baits	50,794	pounds
Red squill baits	3½	pounds
Anticoagulants baits	11,155	pounds
Carbon bisulphide (#)	34,767	pounds
Jute waste balls	5,400	
Methyl bromide	2,936	pounds
Cost	$110,156.91	

Economic Control of Rodents and Injurious Birds

Ground squirrels were controlled on 10,500,000 acres at a cost of $392,000. This is an increase of 100 percent in acreage at but a slight increase in cost. The cost of control of other rodents and injurious bird species showed no appreciable change. During the year this bureau conducted 15 meetings throughout the State for the purpose of discussion of rodent and injurious bird control methods. These meetings were attended by 234 inspectors and others engaged in this work. To provide for the adequate protection of birds, the department has requested that all grain baits used in open field baiting for the control of rodents be dyed.

Meadow Mice

The agricultural commissioners' reports indicate a reduction in meadow mouse damage. The acreage treated and cost is half that of last year. Experimental work with Toxaphene and Dieldrin is continuing in the delta area specifically in alfalfa fields. Grain baits are used for the bulk of the work.

Rats and Mice

The Norway rat population in the northern San Joaquin Valley and the Sacramento Valley shows continued increase.

Commissioners from several counties in this area report more requests by farmers for assistance regarding control methods. Personnel of this bureau and several county departments of agriculture have outlined tentative field tests scheduled for trial pending favorable conditions. Bait boxes will be used in trial work and may be recommended for areas of high pheasant population.

Woodrats have been effectively controlled with anti-coagulant bait materials in some areas. Control of woodrats is usually difficult with materials available to the public.

Coypu

Frank Barmettlor of the United States Fish and Wildlife Service reports the finding of coypu tracks in Stanislaus County again after several years during which no evidence of these acquatic rodents was noted. Tracks were found at two locations, one at an area where it was thought a few might exist and the other at a spot from which animals had been previously trapped. These sites will be checked again at a later date and trapping begun if further evidence can be found.

In the Yuba City area the entire breeding stock of one coypu raiser was drowned during the flood. These animals had been confined in covered pens. Another breeder has recovered or accounted for all but two of his escaped animals, and expects to trap these.

Regulations of the California Fish and Game Department now provide for licensing of breeders. Permits issued to 300 persons during 1955 indicated a total of 2,300 to 2,400 animals are now held in confinement in California as breeding stock and young.

Rabbits

Considerable losses to crops were again reported from Southern California, particularly in the desert areas. Control measures with strychnine treated baits as outlined in the 1954 reports have continued to provide at least temporary relief of the problem in many cases; however, the continued presence of this high population which has maintained its peak since 1953 has prompted many ranchers to protect crops by construction of rabbit fencing.

One of the largest of these fenced areas extends 15 miles with corral traps placed at intervals along the fence. To date 14,000 rabbits have been taken by traps and shooting.

A die off in Mono County has reduced the rabbit population in certain areas to the extent that losses to growing alfalfa and stacked hay are at a minimum.

Muskrats

The Zoology Division of the University of California at Davis and this bureau continued investigation of possible methods of muskrat control. Toxic baits were exposed in bait boxes at several locations using three kinds of rodenticide. Results were inconclusive but not discouraging. Some night observations were made of behavior and use of bait boxes which are expected will prove helpful when further work now scheduled is resumed.

Personnel of this bureau are cooperating with the Coachella Valley Canal District in Riverside County on muskrat depredation problems. Clay lining of much of the canal is necessary to prevent seepage of water. Muskrat burrowing through the clay presents a critical need for adequate control. Trapping has not been successful in the past and poison bait plots using bait boxes are being established in certain parts of the canal.

The 1954-1955 fur report indicates an increase over the number of muskrats trapped in 1953-1954 with an appreciably higher number of animals taken in the San Joaquin Valley.

The following table denotes the extent of economic rodent and bird control as reported by agricultural commissioners.

Pest animal	Area treated	Cost
Ground squirrels	10,579,385 acres	$392,398.71
Rats and mice	9,085 premises	24,786.59
Meadow mice	5,705 acres	1,530.16
Gophers	70,763 acres	18,875.19
Rabbits	23,520 acres	3,658.03
Kangaroo rats	51,362 acres	461.55
Badgers	17 acres	90.25
Moles	183 acres	451.43
Blackbirds	76 premises	1,269.40
Horned larks	517 premises	2,699.93
Linnets	1,001 premises	3,727.65
English sparrows	893 premises	2,589.98
Crowned sparrows	826 premises	2,808.36
Crows	23 premises	399.75
Magpies	2 premises	3.40
Others (miscellaneous)	7 premises	166.32
Total cost		$455,916.70

Material	Pounds
1080 (sodium fluoracetate bait)	291,251
Strychnine bait	161,350
Zinc phosphide bait	64,893
Thallium bait	2,402
Red squill bait	697
Anti-coagulant baits	27,834
Total pounds toxic baits	548,427

Fumigants	Pounds
Carbon bisulphide	216,000
Methyl bromide	1,926
Total pounds fumigants	217,926
Jute waste balls	197,670

Miscellaneous

Commissioners have been called on for help in skunk control for the suppression of rabies and have cooperated with local health departments toward that end. In addition to the usual trapping methods poison meat baits were placed in surface irrigation pipe four to six inches in diameter from 2½ to 10 feet in length. Baits were thereby adequately protected and control effective.

Mole control was necessary in Tulare County where damage to young pomegranate trees was caused by gnawing of the roots. Three hundred and fifty trees were lost in this planting of 20 acres in 1954; in 1955 the loss was cut to nine trees. In this case 1080-treated angle worms proved effective.

European Starling

The starling population remained at a low level during the remainder of the 1954 migration. Due to the lesser number present, few observations were made. None were reported after the first of April; hence their departure earlier seems certain.

The 1955 migration began sometime prior to November 1st at which time 100 or more were seen at Ramirez Station north of Marysville. Shortly following this observation numerous flocks were seen between Willows and Orland with a possible total of 2,000 birds. These remained in a relatively small area and were usually in flocks of from 50 to 500 birds. By mid-December the area of apparent use extended westward into the foothill section.

Sonoma County reports the finding in early December of starlings in much greater numbers than noted in Glenn County. Conservative estimate placed the figure at 8,000 to 10,000 birds, possibly more. The effect of the heavy storms and high winds on the relatively large flocks of starlings is not known at present and cannot be checked until weather conditions normalize.

The extension of the range of starlings in California is seen in the report of Eben McMillan, rancher and ornithologist of San Luis Obispo County. Mr. McMillan reports seeing three birds two miles south of Shandon in December 1954; 10 in the Carissa Plains district in February, 1955. Again, on the next year's migration starlings were see 10 miles southeast of Shandon in November, 1955. It is believed the above comprise the first observations in the central coast area.

Bird Damage

Damage to fruit buds and truck crops was reported from several areas of the State. The usual disbudding by linnets and damage to lettuce by horned larks and white-crowned sparrows was evident. Blackbird damage in the rice-producing areas has increased and centers in the Colusa, Glenn and Butte County area of the Sacramento Valley. Depredations by mudhens continue to increase in both the Sacramento and San Joaquin Valleys. Principal damage is to alfalfa, clover and grain crops. Official agencies are studying the problem in an attempt to provide crop protection. The recent use of acetylene frightening devices shows promise.

Several new frightening devices are the subject of experimental work by the United States Fish and Wildlife Service. Mechanical refinements are reported to increase effectiveness of these devices.

PREDATORY ANIMAL CONTROL

H. NELSON ELLIOTT, *District Agent, United States Fish and Wildlife Service*

Predatory animal control for the protection of livestock, poultry, certain crops such as melons and grapes, the suppression of rabies, and as an aid to game management, was conducted under the joint program of the California State Department of Agriculture and the U. S. Fish and Wildlife Service in cooperation with 34 counties and the Tehama County Predator Association.

During the year 24 of the cooperating counties and the Tehama Predator Association provided salary increases for hunters carried on their rolls.

In addition to coyotes, bobcats and bears there were numerous instances where special efforts were required to control fox, raccoon, skunk and other small animals to protect poultry and crops. Special effort was also directed to control of the smaller animals in interest to rabies suppression.

Losses occasioned by predators varied during the year. The greatest numbers of sheep killed by coyotes were in Plumas, Tehama, Placer, El Dorado, Sacramento, Yolo, Solano, Sonoma, Stanislaus, San Joaquin and Mariposa Counties. Losses of small numbers of sheep were also reported from several other counties.

Although complaints of losses of weeder geese to coyotes in San Joaquin Valley cotton fields are not unusual some rather severe losses did occur during the summer months, when growers failed to recognize the trouble or request hunter service.

A possible total loss of a watermelon crop in the Wildwood area of Kern County was prevented by the removal of a number of coyotes from the area soon after they had started feeding on the melons.

Several instances of turkey losses to coyotes and bobcats occurred in Tuolumne and Tulare Counties.

In addition to continuing to be the major predator in Humboldt County bears also destroyed sheep in El Dorado, Placer, and Sierra Counties. Perhaps the most severe individual instance of trouble by bears occurred in Tuolumne County where bears killed 135 turkeys on one ranch during July. Four bears were known to have participated in the raids on the turkey pens and it was necessary to destroy seven animals before the trouble was stopped.

The 164 positive cases of wild animal rabies which were recognized in 31 counties during the year represent the greatest number of cases to occur in California since 1916 and involve the widest distribution known during a single year. Wild animals involved include 138 skunks, 20 fox, three bobcats, two bats and one raccoon.

Effort was directed to control of the smaller animals throughout the area normally serviced by hunters engaged in the cooperative program with special emphasis in Butte, El Dorado, Merced, Napa, Sacramento, Shasta, Sonoma, Tehama, Tulare and Ventura Counties. Several points significant to economic mammal control are observed in reviewing the present endemic status of the disease. In 12 of the 31 counties involved only one case in wild animals has been recognized in each.

In excess of 84 percent of all wild animal cases are in skunks which are the least aggressive of the species involved and have a more limited home range than any of the others. In those areas continuously worked by the hunters populations can be managed in connection with normal coyote and bobcat control. The greater number of skunk rabies cases have been from the more populated areas which are not involved to any extent in economic work. This does, however, present two important problems—dif-

ficulty in the employment of effective control and the increased possibility of the infected wild animals transmitting the disease to dogs and humans.

Based on numbers of animals destroyed the coyote and bobcat populations appear to be on the decline. During the year there were 355 bobcats and 829 coyotes less than the same number of hunters accounted for in 1954.

The California Woolgrowers Association, officials of the U. S. Forest Service, Bureau of Land Management, various county agricultural commissioners and farm advisors contributed valuable assistance to the program.

In addition to the above we have the following reports directly from the counties involved:

The agricultural commissioner of San Bernardino reports the following predators taken: 174 coyotes, 91 bobcats, 29 wild dogs, 50 foxes, 39 wild house cats, 1 badger, 3 ringtail cats and 21 predatory hawks; also 17 rattlesnakes.

San Luis Obispo County reports the expenditure of $1,500 for the control of predatory animals in the fiscal year but states that no record has been kept of animals trapped due to the fact that the coyote population was greatly reduced in previous years with the use of 1080.

The agricultural commissioner of Fresno County reports the trapping of the following predators during the year: 109 coyotes, 37 raccoons, 180 skunks, 74 civet cats, 64 badgers, 102 oppossums, 23 bobcats, 58 wild dogs and 2 bears.

In Monterey County the following predators were trapped by employees of the agricultural commissioner's office: 93 coyotes, 81 bobcats, 161 foxes, 26 badgers, 81 coons, 26 oppossums, 77 skunks and 15 miscellaneous predators. The commissioner reports having trouble with rabid skunks and expects to continue with this work in the next year.

Total Funds Available for Work During Calendar Year 1955

Agency	Total
State of California	$201,195.00
Federal	44,644.00
Counties	177,806.00
Association	16,440.00
Total	$440,085.00

The following funds were appropriated by cooperating counties effective July 1, 1955, for the fiscal year ending June 30, 1956:

County	Amount
Alameda	$4,800
Amador	3,300
Butte	9,282
Calaveras	4,538
Contra Costa	4,872
Del Norte	3,160
El Dorado	4,512
Humboldt	20,960
Imperial	3,465
Kern	9,225
Lake	5,157
Lassen	5,580
Los Angeles	4,910
Madera	4,628
Mariposa	2,130
Merced[2]	3,716
Modoc	4,716
Napa	9,261
Nevada	3,360
Placer	4,080
Sacramento	3,960
San Diego	4,620
San Joaquin	4,356
San Mateo	4,584
Santa Barbara	4,620
Santa Clara	4,116
Santa Cruz	2,118
Shasta	9,120
Solano[1]	3,720
Sonoma	9,600
Stanislaus[2]	3,180
Tulare	4,272
Tuolumne	4,638
Yolo	8,261
Total	$186,817
In addition the following funds were made available:	
Tehama County Predator Association	17,280
Grand total	$204,097

[1] In addition pays mileage of hunter.
[2] Also furnishes car for hunter use.

Predators Taken

Hunters paid by	Bear	Bobcat	Coyote	Mountain Lion	Badger	Fox	Skunk	Opossum	Raccoon	Total
State of California	43	1,239	3,140	1	553	1,614	895	336	836	8,657
Counties	65	1,325	2,508	6	306	1,835	1,010	263	1,297	8,615
Association	1	135	218		33	218	197		216	1,018
Totals	109	2,699	5,866	7	892	3,667	2,102	599	2,349	18,290

SEED INSPECTION

EMRO C. BRUCH, *Field Supervisor of Seed Inspection*

The Seed Inspection service of the bureau is charged with the administration of the California Seed Law, the seed screenings and the one variety cotton districts provisions of the Agricultural Code, and maintenance and operation of the State Seed Laboratory. This function includes regulatory work in connection with the local agricultural commissioners.

The bureau is represented on the California Seed Council. The purpose of the council is to review all seed legislation and to afford an opportunity of informational matters pertaining to seed.

The seed inspection work in the San Francisco district, which is composed of the 16 northern coastal counties, has progressed very well during the second full year with a senior seed inspector in charge. There has been a decided increase in the number of official samples drawn.

A particularly difficult problem in this district has been the labeling of lettuce seed with such terms as "L. M. C.," "Low Mosaic Count," "Mosaic Indexed" and other indefinite terminology. It has been observed that lettuce seed infected in excess of one-tenth of 1 percent with mosaic would not produce a marketable crop of head lettuce if aphids were present in their usual numbers. In order to check on some of the labeling information, the bureau in cooperation with the Division of Plant Pathology, and the Vegetable Department, University of California at Davis, planted lettuce seed from three different lots to index the mosaic content. These samples indexed 1.42, 1.65 and 1.86 percent mosaic respectively. Two of the lots were "Stop-saled" due to false and misleading labeling as to mosaic content. Some 30 official samples of lettuce seed labeled with some reference to mosaic have been drawn. Increased activity in seed inspection has occurred in the Los Angeles district. The sampling of vegetable packets has progressed well in this district and has resulted in several of the seed companies perfecting their methods of servicing seed packet racks. Sampling of lawn seed mixtures has done much to lower the percentage of violations found in this type of seed in 1954.

During the year 963 official samples were drawn, an increase of 23 percent over 1954. The samples represented 589 lots of agricultural seed and 374 lots of vegetable seed submitted by agricultural commissioners of the following counties: Los Angeles, 474; Riverside, 94; Santa Clara, 63; Kern, 53; San Francisco, 39; Fresno, 33; Stanislaus, 20; San Bernardino, 18; Alameda, 16; San Diego, 16; Santa Barbara, 16; Imperial, 15; San Mateo, 15; Santa Cruz, 13; Humboldt, 12; Monterey, 11; Solano, 11; Contra Costa, 8; Mendocino, 6; Ventura, 6; Lassen, 3; Napa, 3; Butte, 2; Kings, 2; San Benito, 2; San Joaquin, 2; San Luis Obispo, 2; Shasta, 2; Yolo, 2; Lake, 1; Merced, 1; Orange, 1; Sacramento, 1.

Twenty agricultural commissioners submitted no official samples. One hundred seventy-seven, or 30 percent, of the lots of agricultural seed sampled were in violation of the California Seed Law in the following respects:

	Instances
Mislabeled as to	
Inert matter	47
Germination	41
Purity	37
Other crop	29
Weed seed	17
Name	10
Other false statements	10
Claiming "no ryegrass"	7
Sum of germination and hard seed	4
Noxious weed seed	3
"Certified" or "registered" seed	2
Other violations	
Germination outdated	5
Contained primary noxious weed seed	3
Not labeled as to	
Name	16
Purity	7
Germination	6
Inert matter	4
Weed seed	4
Date of test	4
Other crop	3
Lot identification	3
Name and address of person labeling or selling seed	2

Sixty-seven or 18 percent of the lots of vegetable seed sampled were in violation of the California Seed Law in the following respects:

	Instances
Mislabeled as to	
Germination	2
Variety	1
Not labeled	
"Below standard"	63
In the English language	2
As to variety	2

There were 2,066 "Stop-sale" orders issued during 1955. "Stop-sale" orders were issued for the following violations:

Violation	*Instances*
Germination test outdated	1,926
Incompletely labeled	366
Unlabeled	281
Date of shipment outdated	147
Mislabeled	107
Treated seed without appropriate warning	3
Not legibly labeled	3
Containing primary noxious weed seed	1

The number of "Stop-sale" orders increased 541 or 35 percent due to a decided increase in number of inspections made, particularly in the southern and north coastal districts of the State.

One complaint filed under the California Seed Law resulted in a plea of guilty. The defendant was fined $100 and sentenced to 90 days in jail which was suspended pending compliance for one year.

The California Crop Improvement Association Trust Fund

The bureau is charged with the supervision of the regulatory phases of seed certification and has performed these services as authorized by Section 916.1, Agricultural Code, through the continuance of the California Crop Improvement Association Trust Fund. The Director of Agriculture and the California Crop Improvement Association have continued this agreement whereby the association would provide funds for the department to employ a senior seed inspector to supervise the regulatory phases of the seed certification program performed by the county agricultural commissioners and their staffs. The trust fund also provides for the employment of a seed analyst, Grade 1, who has been assigned to the Branch Seed Laboratory at Davis, which has been equipped by the association. The excellent cooperation received from the county agricultural commissioners has done much to facilitate the certified seed program, which has increased 41 percent in terms of acreage over 1954, in the production of a seed of a known genetic purity identity with a high standard of viability.

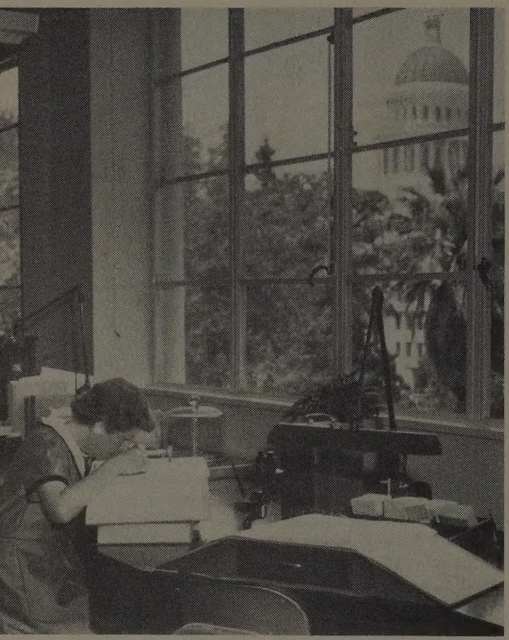
Federal-State Seed Laboratory

The Sacramento laboratory's work load increased 20 percent over the previous year and was the busiest year on record. During the last three months of the year some seasonal aides were employed and trained to assist in the work. A laboratory manual for seasonal aides had been prepared earlier in the year by the experienced analysts and it proved very beneficial.

Racks used in the germination laboratory to hold seed tested in rolled paper towels

The Khapra beetle interior quarantine, established in January of this year, presented several problems related to agricultural and vegetable seeds. High dosages of methyl bromide became necessary in the warehouse fumigation phase of the eradication program conducted by the Bureau of Entomology. In order to determine the effects of high dosages and long exposures of methyl bromide to seeds it became necessary for this bureau in cooperation with the Bureau of Entomology to fumigate samples of various seed with different moisture contents at varying dosages of methyl bromide under different lengths of exposures. This work was assigned to a seed analyst, Grade I. Seventeen different kinds of agricultural seed were investigated in this manner during the year, requiring a total of 1,250 germination tests. Circulars indicating the findings of these tests have been released currently to the county agricultural commissioners and other interested parties. A complete summary of the investigations will be released in an early edition of the Bulletin.

Cooperation with the Federal Government in testing federal samples and enforcement of the Federal Seed Act was maintained as in previous years. During 1955 there were 652 samples of imported seed requiring 1,252 tests and 495 other miscellaneous federal samples requiring 816 tests. This amount is an increase of 7 percent and 4 percent in the number of samples and tests, respectively, over 1954. State and county personnel reported 23 lots of seed suspected of being in violation of the Federal Seed Act. Samples taken from these lots



Seed analyst working in the bureau's purity room

required 53 tests or 2.5 percent of the total federal tests. One suspected violation was found to be of a kind of seed not subject to the Federal Seed Act. Letters of warning were issued by federal authorities for the shipments involving 21 lots and action is pending with respect to one lot. One court action was completed by federal authorities during the year and two prosecutions are pending in the United States Department of Justice as a result of the Federal Seed Act violations previously reported by California state and county inspectors.

Fees and Tests

Fees amounting to $31,075.50 were collected on 7,041 service and certification samples on which 2,852 purity tests, 6,683 germination tests and 402 noxious weed seed examinations were made.

This decrease of nearly 3 percent in the total revenue was due to a decrease on the number of samples received from the California Crop Improvement Association which resulted in $1,287 less revenue from that source. An increase of 2 percent of the number of service samples brought an additional $418 gain from that source. Investigational samples increased by 1,605 samples or 433 percent due to the fumigation-germination investigations of the Khapra beetle suppression program. The quarantine samples tested by the Sacramento laboratory increased by 93 or 12 percent and the same type of samples tested by the Los Angeles laboratory increased by 1 percent.

The accompanying table summarizes the work, exclusive of federal samples, of the state seed laboratories for 1955.

	Number of samples	Purity	Germination	Identification	Noxious weed examinations	Total
Sacramento Laboratory						
Official (California Seed Law)						
Agricultural seed	589	575	589	0	0	1,164
Vegetable seed	374	2	374	0	0	376
Service Samples	3,974	358	3,986	0	221	4,565
California Crop Improvement Association	3,067	2,494	2,697	0	181	5,372
Investigation Samples	1,976	31	1,964	0	2	1,997
Quarantine Samples						
Bureau of Plant Quarantine	245	0	0	3	242	245
Agricultural Commissioners	587	0	0	168	422	590
Total for Sacramento Laboratory	10,812	3,460	9,610	171	1,068	14,309
Los Angeles Laboratory*						
Quarantine Samples						
Bureau of Plant Quarantine	0	0	0	0	0	0
Agricultural Commissioners	2,727	0	0	69	2,658	2,727
Service Samples	0	0	0	0	0	0
Total for Los Angeles Laboratory	2,727	0	0	69	2,658	2,727
Grand total	13,539	3,460	9,610	240	3,726	17,036

* Identifications and noxious weed-seed examinations are the only seed tests made at this laboratory.

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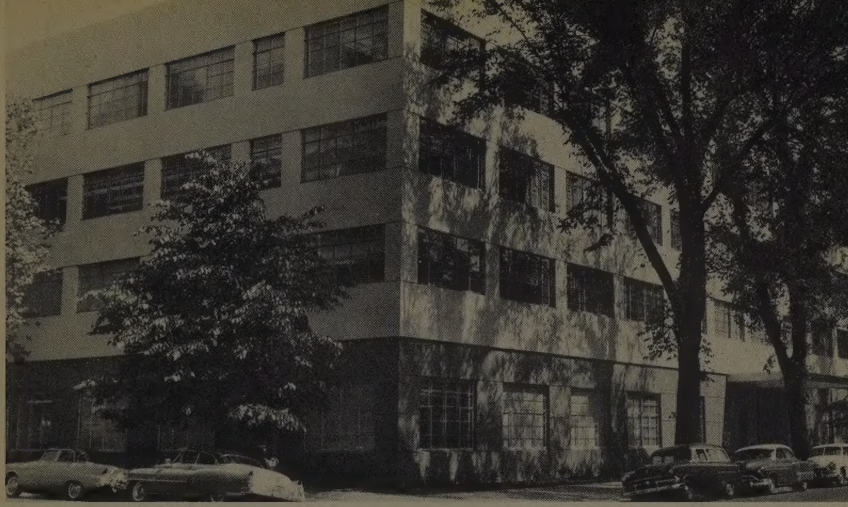

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